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CHRONIC BRAIN INJURIES WITH REMARKS CONCERNING THE PATHOLOGY AND TREATMENT

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THE term "chronic brain injury" naturally presupposes a recovery from the acute condition whether the treatment may have been palliative or operative. From the study of a large series of these patients, it has become my opinion that the operative treatment is indicated in only about one-third of the cases; only in those in which the increased intracranial pressure due to hemorrhage or cerebral œdema is of such a height that recovery and future normality is more probable by the operative than by means of the expectant palliative method alone; in the other two-thirds of these patients in whom an increased intracranial pressure is not marked, the assistance of the expectant palliative method of treatment to the natural means of absorption of the intracranial hemorrhage and of the excess cerebrospinal fluid will usually prove sufficient, not only for the preservation of life but also for the recovery of apparent normality. The expectant palliative treatment of these selected patients is frequently aided by profuse bleeding and the discharge of cerebrospinal fluid through a fracture of the vault into the tissues of the scalp and, in selected patients, by repeated lumbar punctures or spinal drainage, so that the intracranial pressure is not permitted to rise to a height necessitating the cranial operation of decompression and drainage. Naturally, all depressed fractures of the vault should be either elevated or removed—whether an increased intracranial pressure is present or not—for fear of future complications of mentality, of emotional reactions and of epilepsy. If, however, in these cases of depressed fractures there is a great increase of the intracranial pressure, as registered by the ophthalmoscope and especially by the spinal mercurial manometer during lumbar puncture, then the operation of removal or elevation of the depressed area of the vault should be preceded by an ipsolateral subtemporal decompression to lower this increased intracranial pressure, so that the local operation of elevating or removing the depressed bone can be safely performed without damage to the adjacent and highly developed cerebral cortex, which otherwise might be extruded and would, as a result, add danger to the decompression. In many of these latter cases, the chances of the patient would be better without any operation than with this method of local operation alone.

Interest in conditions of brain surgery has been greatly stimulated during the past few years; this is due, to a large extent, to the frequency of gun-shot and shrapnel cranial injuries in the recent war. In these direct brain injuries involving a more or less extensive destruction and loss of cerebral tissue, the gross pathology has been rather an obvious one—a penetrating wound of the vault with varying

*Read at the Ontario Medical Association meeting, Niagara Falls, June 1921.

degrees of local bony change and, most important, the opening of the underlying dura with direct cerebral or cerebellar destruction; the associated subdural and intracerebral hemorrhage together with the cerebral edema was the usual cause of the increasing intracranial pressure sufficient to extrude cerebral tissue. The treatment of these acute conditions cannot be described in detail in this paper and I shall limit my observations to those conditions of chronic brain injuries of civil life rather than to those of war; that is, to brain injuries associated and unassociated with fractures of the skull, and especially to the so-called "fracture of the base of the skull;" brain injuries resulting from depressed fractures of the vault will only be mentioned.

Just a word regarding the two stages in these acute conditions of brain injury in which *no* operation should be performed no matter how badly the skull is fractured, how large the intracranial hemorrhage, nor how imminent death may seem: there is first, the stage of severe initial shock, and second, the stage of medullary edema—the terminal period. If a patient is in such a condition of severe shock following the cranial injury that the temperature is subnormal and the pulse-rate is 110 and even higher, and this in addition to the other signs of shock and particularly that of lowered blood pressure, then the treatment should be limited entirely to the treatment of the condition of shock; any operation in this period would merely be an added shock for the patient to overcome; if he should survive, the recovery would not be due to, but would rather be *in spite of*, the operation. If the patient is unable to survive the shock of the injury itself, surely the additional shock of an operation will not aid him. For this same reason, prolonged neurological examinations of the reflexes, fundi, etc. should be postponed and all the efforts directed toward assisting the patient to survive the shock. When this is accomplished, then the most careful examinations are permissible and the appropriate local treatment possible, and the patient's chance of recovery is neither lessened nor even prevented. It is the general condition of the patient in this stage of severe shock that demands immediate treatment rather than the local condition, and an important factor in the high mortality of brain injuries has been the neglect in treating this general condition of severe initial shock. The other important factor in the high mortality of brain injuries has been the frequent delay and postponement of a cranial operation in those patients having an extreme intracranial pressure particularly when due to subtentorial hemorrhage, until the natural resistance of the patient to this high intracranial pressure of hemorrhage or of excess cerebrospinal fluid has been exhausted during a period of hours or of days. Delays of even two or three weeks in those patients having an increased intracranial pressure of less severity and who are yet unable "to take care of it" completely by the natural means of absorption are equally dangerous. If the patient has continued in the stage of medullary compression for a period of hours or even of days, as indicated clinically by the blood pressure being definitely increased and by the rate of the pulse and respiration being irregular and slowed down to even 50 and 10 respectively, and if then the rapidity of the pulse and respiration begins to rise rapidly, while the blood pressure falls and the temperature ascends (the typical picture of medullary edema and the *terminal* stage), it would be reprehensible to advise at this late period any cranial operation "in the hope of giving the patient a chance." These patients all die with or without an operation; in fact, any operation performed in this stage of medullary edema merely hastens the exitus. This period of medullary edema can usually be anticipated and even prevented in the treatment of brain injuries, either by the expectant-palliative method, or by the operative method of cranial decompression and drainage in those cases in which the clinical signs, especially those revealed by the ophthalmoscope and by the spinal mercurial manometer, indicate a marked increase of the intracranial pressure to such a height that it is doubtful if the expectant palliative treatment alone can lower it. To permit a patient to enter and to continue in the stage of medullary compression is running a very great chance either of death or of permanent mental and physical impairment. But on the other hand, if the patient has advanced from the stage of medullary compression into that of medullary œdema with an increasing pulse and respiration rate, no operation is advisable; the patient is not benefitted, to say the

least, and cranial surgery is merely discredited.

I realize now that in a recent work upon the diagnosis and treatment of brain injuries,* I did not emphasize sufficiently the relative unimportance (in my opinion) of a definite increase of the blood pressure except as indicating the lateness of the time for operative interference, since this increase of the blood pressure is a sign of medullary compression and the patient should be given an opportunity to recover by an earlier lowering of the increased intracranial pressure, either by the expectant-palliative or by the operative method. If we delay in the treatment until the blood pressure is definitely increased, then we are letting the patient reach a very serious condition of medullary compression and it is frequently too late to aid him even by an operation of decompression and drainage. In my opinion, the ophthalmoscope and spinal mercurial manometric findings are infinitely more valuable than the general blood pressure as a definite and delicate test in ascertaining early the presence of an increase of the intracranial pressure, whether from hemorrhage or from an excess of cerebrospinal fluid. Naturally, the presence of shock is characterized by a lowered blood pressure together with a subnormal temperature and an increased pulse-rate, whereas the stage of medullary œdema presents a rising temperature, pulse and respiration rate and also a falling blood pressure, so that clinically these two periods may at times be confused.

During the eight years, 1913 to 1920, I examined and treated personally over 500 adult patients having acute brain injuries with or without a fracture of the skull. In only 31 per cent. of these patients were there marked signs of an increased intracranial pressure, and therefore, only these patients were operated upon to relieve this increased pressure; the remaining 69 per cent. of the patients did not show definite signs of an increased intracranial pressure and were therefore treated by the expectant-palliative method of absolute quiet, ice helmet and catharsis; if they were in shock, then the routine treatment of shock was employed. It is thus seen that only one-third of the patients having acute brain injuries with or without a fracture of the skull were operated upon, and approximately this same ratio has continued during the past year. It is this careful selection of patients not only in regard to the advisability of an operation and the type of cranial operation to be used, but also, particularly in regard to the ideal time for performing the operation that has made it possible to lower the mortality of the so-called "fractures of the skull" from the average 50 per cent. of most hospitals to 30 per cent. in this series of acute cases, and if we exclude the moribund patients dying within three hours after admission to the hospital from shock and internal injuries, and the many cases in which the fracture of the skull was but an incident in the patient's general condition, then the mortality is brought down as low as 19 per cent. Naturally, the types of alcoholic, arteriosclerotic and nephritic patients so frequently admitted to large municipal hospitals following a cranial injury have a much lessened life expectancy than have the usual types of patient in private practice or in the smaller private hospitals, so that this mortality factor must be remembered whenever statistics of brain injuries are discussed; in the former group of patients, even the most trivial cranial injuries may precipitate an extensive cerebral edema and their reaction and resistance to this condition is greatly impaired.

Within the past few years, the profession has been more and more impressed with the end-results in these patients; to be sure, the preservation of life is essential and yet the idea in treatment of the acute condition should be not only to preserve life, but also to restore to the patient a condition of approximate normality, both mentally and physically. The attitude of the profession toward a patient recovering from a "fracture of the skull," particularly of the base, with his mental, emotional and physical condition not so normal as before the injury is "Well, he had a fracture of the skull, and should consider himself fortunate to be alive." It has been this feeling of comparative helplessness on the part of the profession that has permitted these patients to be much neglected; the mental and physical impairment has been regarded as due to a definite gross primary brain lesion at the time of the injury and therefore, an irreparable condition. Fortunately however, this is a fact in only a small

*The Diagnosis and Treatment of Brain Injuries, with and without a Fracture of the Skull, 1921. J. B. Lippincott Co., Philadelphia.

percentage of patients who have had a severe cranial injury with or without a fracture of the skull, and it is these selected patients, having so-called "chronic brain injuries," that I wish to discuss here.

During the past eight years, I have had the opportunity of examining and treating a large series of patients having acute brain injuries, and at operation and at autopsy I have been impressed with the comparative rarity of extensive cerebral laceration. It is conceded that in large compound, depressed fractures of the vault and in the occasional gun-shot injuries in civil life, extensive cerebral laceration does occur, and that therefore, if the patient should survive, an irreparable brain injury it will present its symptoms and signs. Yet it is indeed most infrequent to have gross tears occur in the cerebral cortex in the ordinary cranial injuries with or without a fracture of the vault or of the base of the skull. At autopsy upon those patients who have died from the extreme initial shock or from an infective meningo-encephalitis or from a terminal medullary edema resulting from high intracranial pressure due to hemorrhage and to an excess of cerebrospinal fluid, the most common of cerebral lesions was a contusion of the superficial layers of the cortex of the anterior and inferior surfaces of either frontal lobe and of the tip of either temporo-sphenoidal lobe; as a rule, there was no extensive laceration but merely a bruising of these areas covered by a thin layer of localized supracortical hemorrhage. Even these findings were not frequent; the most common post-mortem finding was a large amount of free bloody cerebrospinal fluid associated with a layer of supracortical hemorrhagic clot of varying thickness, the brain itself being swollen and edematous, of the so-called "wet" and "water-logged" type. This supracortical hemorrhage and excess of cerebrospinal fluid is also the usual operative finding, and only rarely is a gross cerebral laceration exposed. The relative infrequency of a large cerebral laceration is also suggested by those patients who make such excellent recovery of function, as for instance from a hemiplegia, following most severe cranial traumata with and without an operative decompression, thus confirming the opinion that the immediate paralysis was due rather to local compression of hemorrhage and cerebral œdema than to a gross cerebral laceration. It is in those patients having a high intracranial pressure, especially when this is due chiefly to hemorrhage, that the subtemporal decompression and drainage is the treatment of choice, from the standpoint not only of recovery of life but also of the ultimate recovery of function.

In this paper we desire especially to speak of those patients who have recovered from the immediate effects of the acute cranial injury and yet remain with symptoms and signs of definite impairment, such as severe persistent headaches, dizzy spells, early fatigue, inability to work throughout the whole day as formerly, and manifesting a definite change of personality of the depressed or of the excitable and irritable type, in some cases associated with epilepsy in its various manifestations. These are cases that form a most interesting group for study.

It is an opinion rather common among the laity and to a less extent in the medical profession, that once an individual has had a "fracture of the skull," he is never the same again. Definite changes of personality have been observed very frequently with a lessened interest in his surroundings and ambitions, and an unreliability to such a degree that he has been regarded as a "loafer" and a "good-for-nothing." This condition was termed a "post-traumatic neurosis," a functional disturbance resulting from the "shock" of the injury, "concussion" of the brain, et cetera: while the condition of the smaller number of these impaired patients was considered as due to a gross organic injury of the brain at the time of the accident, contusion and laceration associated with hemorrhage of varying degree; in the absence of macroscopic lesions, the pathology was interpreted as probably due to minute, possibly microscopic changes in the cortical nerve cells or in their coordinating and associated nerve tracts; as such, it was regarded as an irreparable condition.

With this post traumatic condition in mind, I attempted in 1912 to ascertain the present status of those patients at three of the large hospitals in New York City who during the preceding decade of 1900-1910 had had a "fracture of the skull." The mortality of the acute condition was 46 to 64 per cent., while the operative mortality itself was 87 per cent; this

latter was due chiefly to the type of operation performed, usually an extensive osteoplastic "flap" exposure, and the frequent performance of the operation during the initial stage of extreme shock or in the terminal stage of medullary edema. Under these conditions, Doctor Pearce Bailey was undoubtedly correct in his belief that these patients get along just as well without, as with, operation. Of the patients who were discharged from those three hospitals as "well," "cured" or "improved," I was successful in locating only 54 per cent.; of this number 67 per cent. were still suffering from the effects of the primary injury. The chief complaints were headaches, early fatigue, change of personality and, in a very small number, convulsive seizures. The records of these patients thus impaired were instructive in that their hospital residence was usually longer than that of other cranial injury cases by a number of days and even weeks; while frequent notes were found of cases with prolonged stupor and even of unconsciousness, with severe headache and of retarded pulse rate, symptoms and signs indicative of an increased intracranial pressure, rarely had an ophthalmoscopic examination been made and even more rarely had a lumbar puncture been performed. Upon nine of these selected patients, the operation of subtemporal decompression and drainage was performed even at this late date following the injury, and the operative findings were all similar; no gross cortical lesion was exposed, but a "wet," swollen, œdematous brain under varying degrees of increased pressure; along the supracortical veins in the sulci, however, was a cloudy induration of new tissue formation surrounding the vessel walls, which were also thickened. Microscopical sections have now been made of this condition as it occurred in other patients and in children who had had a supracortical hemorrhage at the time of birth; this tissue formation is now recognized as the organization "residue" of connective tissue of a former layer of supracortical blood which had collected chiefly in the sulci about these veins and had blocked the little stomata of exit of the cerebrospinal fluid through the walls of these vessels—the main channels of excretion of the cerebrospinal fluid into the blood stream. In this manner, a mild condition of external hydrocephalus had been produced.

Microscopic sections of the cortical cells and their normal arrangement have only rarely disclosed a definite change of structure, although this added complication cannot be excluded in any case. It is the pathologic condition, however, about the supracortical veins that has been overlooked in the past; and it has only been since we learned that over 80 per cent. of the excretion of the cerebrospinal fluid occurs through the supracortical veins lying in the sulci, that it has been recognised that this condition of new tissue formation following hemorrhage was the main lesion in causing the edematous brain. Those patients making excellent recoveries with the expectant-palliative treatment alone, and over 50 per cent. of them do, undoubtedly are those in whom the natural means of absorption have been sufficient to "take care of" the free supracortical blood; as a result, no residue or new tissue formation takes place and practically all of the hemorrhage is absorbed.

Those patients who have had an intracranial injury, and most probably a supracortical hemorrhage (with or without a fracture of the skull) who have not recovered their former normality and in whom headache, early fatigue, change of personality or even convulsive seizures persist, should be most carefully examined from the standpoint of the presence or absence of an increased intracranial pressure, as found in the fundi with the ophthalmoscope and more accurately still by the spinal mercurial manometer at lumbar puncture. If no increase of the intracranial pressure is present, then the treatment can be only of the expectant-palliative type, for the intracranial damage has already occurred, whether due to a primary gross or to a minute microscopic lesion of the cortical cells, or to a prolonged high intracranial pressure which has gradually become lower as a result of the atrophy of the cerebral cells, a permanent impairment, to be considered as a compensatory lowering of intracranial pressure at the expense of the brain itself. But if a definite increase of the intracranial pressure persists in spite of the usual expectant-palliative treatment, then the patient can be greatly benefitted and improved by means of an early subtemporal decompression and permanent drainage of the blocked cerebrospinal fluid. The dura should be opened widely and permitted to re-

main open and not resutured, otherwise the decompression is only of temporary value. Excellent results have been obtained in this class of patients. The earlier the condition of increased intracranial pressure is recognized and lowered to normal, so much more of an improvement can be expected from the operation. In arterio-sclerotic patients who have greatly deteriorated during a period of years, perhaps even to the degree of insanity, little if anything can be expected from an operation at this late date.

In closing, let me merely mention the similar chronic condition occurring in children as a result of an intracranial hemorrhage at the time of birth, usually in cases of difficult labor, with or without instruments. Such cases are usually first children, and unless convulsive twitchings occur within several days after birth or the child is unusually excitable or stuporous, the condition is liable to be overlooked and the baby may be considered a normal child until the seventh or eighth month, and even later. Then it observed that the child is not holding up its head, and later on does not sit up or attempt to stand until months after the normal time; convulsive twitchings may or may not be present; the development of speech is usually retarded; in fact the entire physical and mental activities are delayed in their manifestations. If examinations now show a marked increase of the intracranial pressure, these are the selected patients who can be greatly benefitted by subtemporal decompression and permanent drainage of the blocked cerebrospinal fluid, even so late as several years following the injury. However, the ideal treatment of the conditions of intracranial hemorrhage is at the time of the acute condition—within the first few days following birth in the baby and within a period of hours following the injury in adults. In these new-born babies, if repeated lumbar punctures with removal of large amounts of bloody cerebrospinal fluid do not suffice to lower the increased intracranial pressure, then a modified subtemporal decompression and drainage operation is immediately indicated, just as in an acute brain injury of adults with the symptoms and signs of high intracranial pressure. Infants who survive a birth hemorrhage, whose increased intracranial pressure has not been lowered to normal, cannot develop as they should, either mentally or physically. As a result of this condition, there is produced that large group of spastic and defective children—the bane of the pediatrist, orthopedist and neurologist. After a lapse of years, however, the selected children having an increased intracranial pressure can be only improved by the operative lowering of the pressure. I have now operated upon 489 of these children, out of over 4000 cases examined, of ages varying from five hours to twenty-three years; and I may state that the lesion is practically the same as occurs in adults from cranial injuries with supracortical hemorrhage.

In conclusion, it is only in those patients who have a definite increase of the intracranial pressure that any improvement can be afforded by means of the cranial decompression. If minute sclerotic changes have taken place in the cortical cells themselves, then an irreparable damage has occurred and even if the increased intracranial pressure is lowered to normal by operation, these advanced patients cannot make a complete recovery of function, although the relief of the pressure should improve their condition. In those patients seen early in whom the increased pressure resulting from a partial blockage of the excretion of the cerebrospinal fluid is the main pathological condition and especially in those who have no organic cellular changes the operation of subtemporal decompression and permanent drainage affords the greatest ultimate improvement and, in the more fortunate ones, may even bring about an apparent cure.

SURGICAL THERAPY AND NET RESULTS IN GALL BLADDER DISEASE

From the Surgical Clinic of Dr. F. N. G. Starr

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Toronto

IN order to arrive at any conclusions regarding the efficacy of surgical therapy in gall bladder lesions, three points must first be very closely considered: First, the indications for surgical therapy; second, the procedures employed, and third, the net results obtained.

The indications for surgical therapy can probably be grouped as follows:

(A) LIFE SAVING—
- (*a*) With jaundice
  - Hepatic duct obstruction.
  - Common duct obstruction from stone, with infection.
  - Common duct obstruction from stone with no infection.
  - Acute inflammations.
- (*b*) No jaundice
  - Acute inflammations in the gall bladder.
  - Rupture of the gall bladder.

(B) ECONOMIC—
- (*a*) Relief of distressing symptoms
- (*b*) Increasing of efficiency.
- (*c*) Prevention of later complications.
  1. All class "a."
  2. Chronic pancreatitis.
  3. Hæmorrhagic pancreatitis.
  4. Carcinoma of the gall bladder
  5. Perforation of gall bladder into gastro intestinal tract, producing obstruction.

I feel that there are few who will doubt the wisdom of at least considering surgery as a possible aid in Class "A." In the hepatic duct obstruction, or in the common duct obstruction with infection, disorder characterized clinically by intense jaundice, and in the case of the common duct by recurring chills and pyrexia, we unfortunately have no choice but to attempt surgical therapy in a patient who presents a desperate surgical risk. In the individual suffering from an acute inflammatory process in the gall bladder in the absence of jaundice, we have a somewhat greater margin of safety than in the individual with a similarly inflamed appendix. However, if a gall bladder remains acutely inflamed and palpable, with no abatement of symptoms after forty-eight hours, we believe that surgical intervention is demanded.

The one clinical fact which appears to be particularly significant in acute inflammatory lesions of the gall bladder, is that the local pathological change is out of all proportion to the constitutional disturbance; as evidenced by pyrexia, tachycardia or leucocytosis; the most outstanding fact being the pain localized over a palpable gall bladder. Even in severe lesions of this type, there may be but very slight rectus rigidity, particularly if the patient is a woman who has borne many children in rapid succession. Thus one should not be be misled by this apparent lack of seriousness of the lesion, but should pay particular attention to the palpable, painful gall bladder which shows no sign of regressing.

A clinical point which has recently been impressed upon us in regard to hepatic duct obstruction is the absence of pain when the stones are situated only in this duct. This is important when we remember that for many years we have all been lead to believe that a painless jaundice was invariably malignant in origin. A recent experience refutes this fact, and emphasizes the necessity of weighing all the evidence, and of not letting a patient with a painless jaundice progress to a fatal issue without an attempted therapy. The obstruction may be found to be of hepatic duct origin and not a malignancy, in which case one may be able to offer a return to health.

No one will question the advisability of surgical intervention in rupture of the gall bladder. However, one must also realize that rupture of the gall bladder occurs much less frequently than one is led to believe from various dissertations in standard text books. In a series of 450 gall bladder cases there have been 3 ruptured gall bladders which were acute, and 4 instances in which an artificial anastomosis had occurred between the gall bladder and the duodenum; in one instance producing an intestinal obstruction. There is, however, one factor of safety in the rupture of a gall bladder which has no analogy

in the rupture of an appendix, namely, that, so far as I have been able to observe a general peritonitis never follows; the mentum, with surrounding structures, forms a barrier preventing the extension of this infection into the general peritoneal cavity.

In the case of a common duct obstruction from stone, in which there is no clinical evidence of infection, such as fever, tachycardia, dry tongue and leucocytosis, the time at which surgical therapy should be instituted is open to debate. My own belief is that the obstruction of the common duct, where stones are subsequently found, is the result of an inflammatory reaction around the stone, rather than that the stone, by its size, occludes the whole duct. For this reason I feel that one should delay operative interference until such inflammatory reaction has been given an opportunity to subside, by which time the jaundice will have disappeared in a very large percentage of cases. In our own experience, and in discussing this subject with many other observers, I have been unable to find a single concrete instance of common duct obstruction producing jaundice, which disappeared, followed by the history that a stone was subsequently found in the faeces. It is commonly contended that this occurs with great regularity. My own belief is that if it ever occurs, it must be very unusual and that the remission of the inflammatory reaction is the factor which allows the obstruction to disappear and the jaundice to clear.

In Group "B" which we have termed the economic group, in which the object of our therapy is the relieving of distressing symptoms, the increasing of efficiency, and the preventing of complications, our opinion must be based upon a consideration of the economic factors. It is sad how often, even at the present day, people with gall stones are given calomel and large doses of oil, in the hope that the calculi will be more readily passed. Such treatment is on the level with the therapy of the 18th century, that period of medicine when the British parliament, paid Joanna Stephens 5,000f. for her stone solvent, which proved to be burnt egg shells and snails with Alicant soap.

Surgical therapy in gall bladder diseases which are producing only partial disability, must have for its justification relief from distressing symptoms, an increase in efficiency, and the prevention of later complications. Opinion is now swinging very strongly in favour of surgical treatment for biliary infections. One naturally expects a failure in the medicinal treatment of gall bladder disease; unfortunately the public and a large percentage of the profession expect miracles from surgical therapy. Too often the brilliant surgical results are forgotten in the great outcry which is raised against the failures, either complete or partial, which are inevitable with any form of therapy. The danger in the present popularity of surgical therapy in gall bladder disease is that, as the operation becomes more safe and is done more often in the early stages of the disease with a negligible mortality, the gall bladder will be removed for every pain above the umbilicus, much in the same manner as, in the past, the appendix has been removed for every pain below the umbilicus, with of course no relief from disturbing symptoms in the instances, in which the lesion is situated elsewhere.

TABLE I

GALL BLADDERS

From January 1st, 1921, to January 1st, 1922

	Recovered	*Died*	*Total*
Acute with stones	9	2	11
Acute without stones	0	1	1
Chronic with stones	23	3	26
Chronic without stones	52	1	53
With associated chronic pancreatitis	8	0	
Total cases	91		
Total deaths	7		

DEATHS CLASSIFIED

Chronic with stones—	1. Gall bladder perforated into the duodenum, making a fistula which had to be undone. Died from shock.
	2. Died one year afterwards from recurrence of duodenal ulcer.
	3. Had an associated large degenerating fibroid. Died from toxemia.
Chronic without stones—	1. Died a year afterwards from duodenal ulcer.
Acute without stones—	1. Had an associated intestinal obstruction and also a 5 months' fœtus. Miscarried 72 hours after operation. Died from shock.
Acute with stones—	1. Died a week later from a broncho pneumonia. Aged 85 years.
	2. Had an associated glycosuria and hæmangioendothelioma of the liver, associated with solitary tubercle of the liver. Died 5 days after operation; cause not definitely determined.

The factors which deter one in advising surgical interference in gall bladder disease producing partial disability are, first of all the possibility of a fatality, and secondly, fear that symptoms will not be relieved. Against that, one must weigh the possible disastrous complication which

may follow long-standing unoperated lesions; the most important being the various severe obstructions, the acute inflammations, and the pancreatic lesions, to say nothing of carcinoma. The main factor which determines the primary mortality or the failure to relieve symptoms, is the stage in the disease at which the operative interference is undertaken.

In our series of 91 cases for 1921, there were 7 deaths (Table I). In the chronic cholecystitis without stone formation, there were 52 cases and one death; that one death occurring a year later as the result of a recurrence of a duodenal ulceration, for which a gastro-enterostomy had to be performed. While it is included in our table as a death against a gall bladder lesion, it is to be remembered that this individual suffered the dual disability. The other six deaths occurred, with one exception, when the disease had progressed to the formation of stone, and in that instance there was an associated intestinal obstruction in a patient five months' pregnant, who miscarried 72 hours after operation. This to my mind is very striking evidence in favour of early surgical intervention in gall bladder disease.

It is interesting to note the ages at which this group of patients was submitted to surgical therapy: 10 were under 30 years of age; 23 were between 30 and 40, and 25 were over 40. In the other cases, the age was not stated. This shows a marked improvement in the age of operative interference as compared with some years ago, but we still have practically 45 per cent. who come to operation after 40 years of age; of these 60 per cent. have stones, with all the potential disasters associated with these foreign bodies in the biliary tract. The death rate from operation performed on patients suffering from stones in the gall bladder is in direct ratio to the amount of involvement of the surrounding structures. The failure to clear up all outstanding symptoms in individuals suffering from stones, depends first of all on the amount of trauma necessary to remove the stone, and secondly on the diseased process which has taken place in the liver and pancreas. Therefore one feels justified, from the standpoint of mortality, in advising surgical therapy in gall bladder disease in its early stage.

The following gratifying results regarding amount of relief from distressing symptoms are shown by the 23 replies to questionnaires, received from patients operated upon in 1921:

TABLE II

	Answered this question	*Were relieved*
Gas	20	17
Nausea	17	17
Vomiting	11	11
Constipation	18	16
Mucus in stools	10	10
Blood in stools	2	2
Headache	9	7

Such results, one can feel sure, must increase the efficiency and comfort of the individual suffering from this disease.

In the case of the patients operated upon since January 1st, 1920, we have the following information regarding relief of symptoms:

TABLE III

	Answered this question	*Were relieved*
Gas	45	33
Nausea	35	26
Vomiting	29	23
Constipation	42	33
Mucus in stools	25	23
Blood in stools	2	2
Headache	21	14

It will be noticed that the results in Table II are better than in Table III. This we feel is explained by the increased post-operative care, together with the fact that these patients are kept under observation for longer periods and are being constantly counselled in regard to diet, habits, etc.

In considering the special procedure to be undertaken in any individual case, one must realize that he is dealing with a human being, who possesses various systems, each with a definite metabolic function, and that, as a result of the disease in the biliary tract, other portions of his organism may be upset. The vast majority of the symptoms from which these individuals are suffering are reflex in origin; the most outstanding are the gastric disturbances associated with biliary disease, such as epigastric distress, feeling of fulness, and gas. This emphasizes the fact that, no matter what the operative procedure is, nor how brilliantly it may be executed, it is simply one phase of the treatment of such individuals.

In the treatment of these cases, pre-operative therapy is of extreme importance. This does not consist in the old regime of dehydration by means of catharsis, loss of sleep from enemas, diminished alkaline reserve in the blood from starvation, and terrible thirst from withholding fluids prior to and following operation. Rather do we attempt to place the patient first of all in such a mental state that worry is abolished to the greatest possible extent. Cathartics are given some time before the operation, preferably in the morning,

In order that sleep may not be interfered with. if the nourishment is below par, they are given glucose either intravenously or by means of the Murphy drip per rectum, in an effort to raise their alkaline reserve, and prevent the subsequent onset of an acidosis, making sure, of course, as in all surgical cases, that no lesion in any other system has been overlooked. This may sound superfluous, but when one becomes particularly interested in a definite lesion, it is only by continuous watchfulness that lesions in other systems are not overlooked, which might prove disastrous.

It becomes imperative at times to advise and undertake surgical therapy in the presence of a very severe jaundice. In such cases it was our practice in the past to give 100 grain of calcium daily for two or three days prior to operation, coupled with blood transfusion immediately before the operation. Following the transfusion of 600 cc.'s of blood prior to operation in a recent case of absolute biliary obstruction of ten weeks' standing, there was no undue worry from hæmorrhage or oozing during the operation. Recently Walters' work in the Mayo Clinic has demonstrated the efficacy of 5 cc.'s of a 10 per cent. solution of calcium chloride given intravenously daily for three days prior to operation. By this means he found he could control absolutely the clotting time within normal limits, despite a most intense jaundice. We can confirm the efficacy of this treatment and we have since, used it on all our jaundiced cases.

In the selection of an anæsthetic, the essential requirement is that it should produce complete muscular relaxation. For that reason we prefer open ether anæsthesia, rather than gas and oxygen with or without the addition of a local anæsthetic.

Regarding the actual operative technique itself, there are certain fundamental principles which apply here as in all abdominal surgery. First of all, it is essential that the approach give free access to gall bladder and ducts and it must leave an abdominal wall firm and unlikely to give way, thus precluding the possibility of hernia. Secondly, all manipulation should be as gentle as possible, in order to avoid shock and post-operative adhesions. Thirdly, the operation should be a procedure which, in view of the patient's condition, is one unlikely to produce a fatality. We all recognize that it is useless to do a brilliant operation and have the patient die, and we also know that it is much harder to do a less severe operation when we feel the more radical one is called for by the lesion, but here the surgical judgment of the individual operator must decide. However, before a direct attack on the gall bladder and ducts is ever carried out, we feel that it is absolutely essential to explore the stomach, duodenum, pancreas and ileo-cæcal region. In this way, and in this way only, can one gain a comprehensive co-relation of the whole pathological condition causing the individual's disability. We would here emphasize as well, the importance of not carrying out operative procedures on the pelvic viscera, or the repair of herniae simultaneously with a gall bladder operation. This subjects the individual to a risk which is wholly unjustifiable. One must remember, however, that lesions in the gastro-intestinal tract must be dealt with, in addition to the biliary lesion, in order to relieve the patient of a gastro-intestinal disability. Whether such therapy in other portions of the gastro-intestinal tract is to be undertaken simultaneously with the gall bladder operation is a question of individual surgical judgment. All things being equal, there appears now to be no argument regarding the efficacy of removal of a diseased gall bladder, as opposed to drainage. Drainage rather than excision may be indicated, first in the presence of extremely severe lesions, which demand a minimum of operative interference, and secondly in the more chronic types of lesion which present too great technical difficulties.

In our series of 91 cases (Table I) there were 7 drainages; 12 of these 91 cases were acute. Of these 12 acute cases, 7 were removed and 5 drained. Of the 7 which were removed, 1 died one month after, but in addition to an acute lesion in his gall bladder, he had pancreatitis, with obstruction in his common duct, necessitating a secondary operation, which was followed by pneumonia and death. There were only 3 deaths in the series of acute cases.

It is inevitable that a certain number of post-operative adhesions will follow these procedures, but one can obviate serious adhesions to a very large extent by closing the raw surface of the liver from which the gall bladder is dissected. In a certain number of cases this is not possible, due to the extent of the raw surface, or to friable liver tissue being impossible of approximation. In such an event, a free omental graft fastened in this area will prevent disabling adhesions of the duodenum to the denuded surface. This adhesion of the duodenum to the raw area from

which the gall bladder is removed, appears to be a most serious post-operative complication, and by these procedures should be obviated.

An associated chronic pancreatitis is, we feel, amenable to surgical therapy. It has been stated that a chronic interstitial pancreatitis is no more amenable to surgical interference than is cirrhosis of the liver. However, in view of Archibald's work proving that spasm at the sphincter of Oddi plays a large rôle in the production of both acute and chronic pancreatitis, we feel that, while one may be unable to altogether undo the damage which has taken place, further destruction can at least be prevented. This is accomplished by means of an opening in the common duct, through which is passed into the duodenum a No. 6 English gum elastic catheter. This catheter, by its continued presence, causes the relaxation of the sphincter of Oddi, with the free flow of bile around it into the duodenun, and has the additional advantage that nourishment (in the form of glucose) and medication, may be introduced directly into the duodenum through this tube. Pancreatitis was present in ten per cent. of the cases operated upon last year.

Formerly it was considered that an operation should practically accomplish a miracle, and the patient who did not immediately feel well following a surgical procedure, was given very little sympathy. In our follow-up system, we have found very few people recover wholly from such an operation within three months. Further, one must remember that their sympathetic nervous system has been rendered hyper-irritable, as is evidenced by the gastric disturbance from which all these people suffer, and that in our operative procedure we can only remove the cause. It must, therefore, be left for nature to finally consummate that return to the normal conductivity of this nervous system, which will be followed by a remission of the symptoms; hence let us still carry our patients for some months after the operative procedure, and not discourage them by painting before operation, a picture of glowing health immediately on discharge from the hospital. Save in a very few instances it is my belief that individuals who have been subjected to surgical therapy for gall bladder disease do not receive the maximum benefit until eighteen months after their operation.

In the past, it has been the custom to neglect what were apparently unimportant details in the post-operative care, with the result that radical therapy was not instituted until some alarming complication ensued. We have tried to prevent this by instituting preventive measures immediately the patient returns to bed; here may be noted the crowding of fluids by means of a Murphy drip containing glucose, which also aids in preventing the production of an acidosis. We aim to ensure relief from pain by the generous use of morphia, the abstinence from severe cathartics, and the cautious use of enemas; distention is dealt with as soon as there is any evidence thereof, by means of a hot linseed poultice applied over the whole abdomen, occasionally accompanied by pituitrin given sub-cutaneously. In the past, one alarming post-operative complication was tachycardia. This we feel has been almost completely eliminated by digitalizing patients by giving from one to two drachms of concentrated digitalis (B. & W.) in the first siz ounces of the Murphy drip solution, immediately on their return to bed. This has been proven to be of inestimable value.

Should pneumonia, or more accurately, chest complications, occur following this type of operation, daily examination of the chest should be made, and at the first evidence of moisture, counter irritation in the form of generous hot linseed poultices should be immediately applied. This condition, if dealt with in its early stages, may largely be controlled.

Occasionally stones are found in a gall bladder that had previously been drained. While it is possible that they may be of recent formation, their presence is more often the result of failure to detect them at the original operation. This may be condoned if the primary operation was for the drainage of an acutely inflamed organ, and may be excused in certain chronic cases in which the gall bladder contained enormously dilated crypts of Lushcka, in which a stone had formed, and which could easily be missed, owing to the thickness of the walls.

To summarize: We feel that in view of the inefficiency of other forms of therapy in controlling sequelae and relieving symptoms of gall bladder disease, surgical therapy should be instituted, preferably in the early stage of the disease prior to the onset of complications, at which time the mortality is practically negligible; and further that such surgical therapy, judiciously applied, will cure 66 per cent. and improve 34 per cent. of cases which survive the procedure.

A CLINICAL STUDY OF CANCER OF THE UTERINE CERVIX: SUMMARY OF THE RESULTS OBTAINED BY VARIOUS METHODS OF TREATMENT*

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FOR the purpose of estimating the relative values of various forms of treatment in cancer of the cervix, a study was made of 475 cases seen in the Mayo Clinic between January 1, 1913, and January 1, 1919. The latter date was chosen so that at least three years should have passed since the patients were first seen at the clinic.

Cancer of the cervix is essentially a local disease. Leitch, in a review of 915 necropsies on patients dying from the disease, found hydronephrosis in 75 per cent. He estimated the duration from onset of symptoms to death, at twenty-one months. Regional lymph nodes were involved in only 38.36 per cent., although this percentage is probably too low if judged by the collected statistics of Döderlein. These patients die of cachexia and uremia rather than extensive metastatic cancer.

The radical abdominal operation, Wertheim hysterectomy, undoubtedly carries a prohibitive mortality in the hands of most operators. We must, therefore, seek an index of the rate of extension of the disease and subject only those patients to extended hysterectomy who have highly malignant tumours, and for whom prognosis for ultimate cure is poor. In the past, the cautery and the knife have been recognized agents in treatment, although a multitude of "cures" have been suggested. More recently, radium, and high voltage roentgen-ray therapy have been introduced. Reports of results obtained by many observers using various methods are confusing, owing chiefly to the fact that the estimated stage of the disease is subject to the personal equation of the observer. The effect of radium may be subject also to variation with the dosage, and the method of application.

In 1912, Percy introduced a method of prolonged cauterization by slow heat, and cited cases of patients who had remained free from recurrence for periods varying from three years to eight months. In 1918, he reported cases of sixty-five patients treated by this method, ten of whom (15 per cent.) were living from two to nine years after operation. A series of forty-three inoperable cases is reported by Cole. He estimates the average prolongation of life at ten months. In seven instances the patients had lived for periods of three years, and in all amelioration was obtained. Balfour, in 1916, reported favourably regarding this method employed in inoperable cases. Later observations on the same patients showed that cure was effected in only two cases as far as is known.

In 1915, Kelly and Burnham reviewed 213 cases of cancer of the uterine cervix and vagina, fourteen of which were operable and 199 inoperable, and reported cures in fifty-three of the inoperable. Kelly believes that three of every four cases of apparently hopeless cancer can be cured by radium and surgery. On the other hand, Graves, in 1921, said very definitely that radium does not permanently cure. He believes that a few inoperable cases may be rendered operable and the patients may live many months and die of recurrence. But in the treatment of recurences he believes that radium offers more than any other method. One of his patients treated with radium lived three years, and one is now living six years after recurrence. In cases favourable for surgery he does not feel justified in substituting radium. Bailey also obtained good results, but the time was too short accurately to judge the outcome.

In a recent paper Clark was extremely enthusiastic with regard to the effect of radium. In 214 cases of inoperable carcinoma of the cervix, twenty-five patients (11.6 per cent.) had lived more than three years, and forty-one others were living more than a year after treatment. Only nine, however, had lived five years. Duncan and

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Schmitz have reported encouraging results. These operators used larger doses than was the custom at the Mayo Clinic during the period covered by the present review. Clark inserted radium needles into the base of the broad and ureterosacral ligaments, a procedure which has not been carried out in the Clinic. Our immediate results have been encouraging but not sustained in the curative sense. However, it is to be hoped that, when sufficient time has elapsed in which to judge the results of treatment during the past three years, there will be a definite increase in the number of patients cured.

In the present series radium was used in inoperable cases in most instances. These patients received vaginal and intracervical applications of about 700 mg. hours (50 mg. for fourteen hours) three or four times in ten days, with usually one or two rectal applications of 100 mg. hours. They returned at intervals of from two to three months for similar treatment. Now, however, bare radium tubes (wall 0.5 mm. silver) are inserted into the cervix and uterine canal after the redundant growth has been reduced by radiation if necessary. The dose, 700 to 3,000 mg. hours, in favourable cases is given at a single sitting and a total of 9,000 to 12,000 mg. hours is given within a period of three weeks. Roentgen ray is also used, but the high voltage radiation has not been tried. The results here recorded must not then be considered as the final conclusions of the staff of the Mayo Clinic relative to radium and nonoperative treatment.

From reports of various authors it would seem that the Wertheim hysterectomy in operable cases offers the best prospect of permanent cure. Graves, in 101 cases, had six operative deaths, 27.6 per cent. five-year cures, and 16.8 per cent. ultimate cures. Still more recently Bonney in 100 cases reports five-year cures of 50 per cent. of the eighty patients who recovered from operation. Including inoperable cases he has 26.1 per cent. five-year cures. His percentage of operability is 63.5, which agrees with that of Graves (64 per cent.), while his immediate mortality has been reduced to 6 per cent. in the last fifty cases. Shaw reports similar results, but it is yet too soon to judge his results. He advocates the use of radium to render the lesion operable, which otherwise would be left to palliative measures.

The operation employed in the series of 475 cases was in some instances a modified Wertheim, less drastic in the extent of dissection than the operation originally advocated. In other instances a much more conservative procedure was carried out, in which a cuff of vagina well beyond the growth was removed with as much of the parametrial tissue as was deemed advisable. The ureters were freed.

The interval between cautery and hysterectomy which gave the most favourable results was one month; most patients operated on after a greater lapse of time did not obtain permanent relief. It is generally conceded that hysterectomy following radium treatment, should be performed after from two to four weeks. This interval allows cellular destruction to take place and antedates fibrosis. Only one patient was radiated one month prior to operation; she lived eight months. However, this procedure is now being carried out in practically all operable cases. Vaginal hysterectomy was performed by the clamp and cautery method.

Besides 475 cases in the series there were eight cases of cancer in the stump of the cervix following hysterectomy, and seven cases in which no treatment was given other than explorations, excisions of specimens, and simple currettage which are not considered. None of these fifteen patients are living.

Sixty (12.6 per cent.) of the 475 patients are living. All have, therefore, lived more than three years. Three hundred and twenty-two are dead. There were four operative deaths, one after simple cautery, two after Percy cautery and one after Percy cautery and hysterectomy. In three hundred and forty-seven cases (January 1, 1922, Table I) the length of life is known. Certain of the patients are living and certain are dead.

The cases were divided into five groups. This admits of error as the grouping is based on the operative findings only when they were available and at other times, on the history of the clinical findings. Group 1 contains the early cases in most of which microscopic examination was necessary to establish a diagnosis. In Group 2 are cases which may be considered operable; there is no extension to the vaginal wall, the uterus is movable and the broad ligaments thickened very little if at all. Group 3 is comprised of cases which might be considered operable were it not for extension to the walls of the vagina. Group 4 contains inoperable cases as determined by fixation and infiltration of the broad ligaments. Group 5 is made up of advanced cases, with involvement of bladder or rectum (Table I).

Thirty-three modes of treatment were used, de-

pending on variations in technique, as for example, in the use of the Percy cautery, whether or not the abdomen was opened and in hysterectomy whether performed immediately, or later. The methods are grouped under four main headings, surgery, radium, Percy cautery, and simple cautery; sub-headings indicate combinations of two or more (Table II to Table VI).

Several factors were common in the series. The average age was practically the same in all groups, forty-eight years; in Group 2, forty-nine years, and in Group 4 forty-seven. The youngest patient was twenty-three and the oldest was seventy-two. All except eleven were married and had borne, on an average, four children. The ages of the youngest children averaged sixteen years. Two of the unmarried women are living. In twelve instances the onset of symptoms occurred during pregnancy, and two of these patients are living. Reports from microscopic examination were available in 277 cases. Squamous-cell carcinoma was found in 249, and adenocarcinoma in twenty-eight. The preponderance of the former, 89.9 per cent., is slightly higher than that given by Ogata (87.7 per cent.).

If the cases in Groups 1 and 2 are considered, the percentage of operability is 44, which is somewhat lower than that of Bonny, Graves, Cullen and others. If cases in Group 3 are included the percentage is raised to 62. Some of the cases in this group proved operable (Table 4).

The average duration of symptoms in each group before the patient sought advice shows a gradual increase in the successive groups. In Group 1 it was 4.6 months; in Group 2, 6.7 months; in Group 3, 6.8 months; in Group 4, 7.6 months; and in Group 5, 11.2 months. This illustrates how a short delay may carry a patient beyond the possibility of operative aid. In fifty-two cases there was delay owing to the physician's failure to recognize the condition. This demonstrates two points: (1) the disease was sufficiently advanced in most cases to be recognized, and (2) a diagnosis was not made and should have been made in certain cases. The patients might have been saved an average of six months of valuable time had a biopsy been made.

In reviewing the results, the normal death rate for women of this age must be borne in mind. It is estimated that forty-three of the 475 would have died during the nine year period. Tables I to VI will show the results obtained. The number of patients treated whose span of life is known, the number surviving four and five years, and the number who died early (within the first year) serves to show the efficacy of the various treatments. If, therefore, under any given treatment we can show a large number of patients who lived four and five years and a small number of early deaths, I think it will be conceded that this treatment is of distinct value as compared with one showing the reverse.

In a few instances the diagnosis of cancer was not confirmed microscopically but in all the tumors were clinically malignant. This applies more particularly to the cases in which radium was used in the earlier years. Since in some of the patients who died the nature of the growth was not known, and it was impossible from the replies received to establish whether death was due to cancer or to other causes, it is reasonable to assume that some of the patients living, who had no microscopic findings, had cancer. In the cases in which the patients are living, diagnoses were positive in all except seven. I have examined specimens of tissue removed in forty of these and I am indebted to Dr. Broders for confirmation of my findings. These specimens were studied from the histologic standpoint to determine if their structure contributed in any way to the survival of the patients concerned. The epitheliomas were graded according to Broders' classification on a scale of 1 to 4. Six (16.6 per cent.) were in Grade 2; twenty (55.5 per cent.) in Grade 3, and ten (27.7 per cent.) in Grade 4. Of the four adenocarcinomas studied one was of particular interest in that it showed marked metaplasia (Figs. I to IV). From these findings it is apparent that even in the case of patients who survive, the tumour is usually of a very malignant type and complete destruction of the growth must be accomplished early if good results are to be obtained.

The length of life under various treatments brings out several interesting facts, although the percentages are based on numbers much too small to render them of value other than comparative (Table VII). It will be seen that the efficacy of vaginal hysterectomy in certain cases is indisputable. Of the nine living patients treated by this method, the greater number had early lesions although one had extension to the vaginal wall (Group 3). Another point well illustrated, if we accept the supposition that similar numbers of tumours of like potentialities are present in the various minor groups, is the fact that delayed

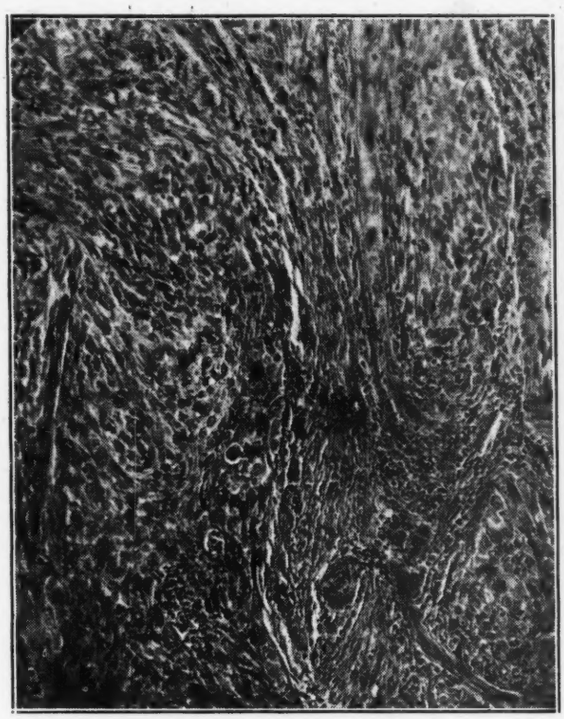

FIG. I (Case A129862).—Squamous-cell carcinoma of the cervix, Grade 4. Active cells with no tendency to differentiation. Patient living and well five years and ten months after total abdominal hysterectomy. (X100).

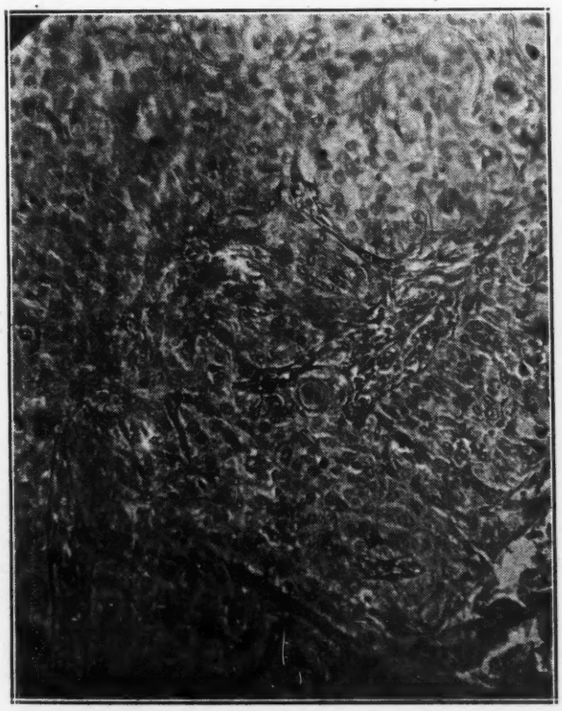

FIG. II (Case A166324). Squamous-cell carcinoma of the cervix, Grade 3. Active cells with small area of keratinization. Patient living and well five years and four months after Percy cautery and immediate abdominal hysterectomy. (X100).

FIG. III (Case A147230).—Squamous-cell carcinoma of the cervix, Grade 2. Differentiated and undifferentiated cells in about equal proportions. Patient living and well five years and ten months after total abdominal hysterectomy. (X50).

FIG. IV (Case A245369).—Adenocarcinoma of the cervix showing metaplasia. Patient living three years and one month after vaginal hysterectomy with recurrence. (X50).

hysterectomy gave better results than immediate hysterectomy in conjunction with simple cautery and Percy cautery. Furthermore, total abdominal hysteresctomy and vaginal hysterectomy, when supported by radium, gave almost identical results, which were apparently slightly better than from either agent alone.

The results of treatment by radium were disappointing. Of 133 patients so treated only six are known to be living; on the other hand, three living patients were treated by cautery and radium. These results must not be given too much weight or used to condemn the method, for the majority of patients obtained inestimable relief, which could not have been given by any other means. The dose used at that time was later found to be too small.

The Percy cautery proved curative in only two early cases, although palliation was effected in the remainder, as cited by Balfour in an earlier review of some of these cases.

Twenty patients of Group 1 (Table II) were treated by surgery alone. Information relative to length of life, is lacking in four instances. Nine are known to be dead and seven living; no patient died within the first year. Nine were living four years after treatment and six were living five years. If these results are compared with those of other methods and the degree of involvement indicated by the group is con-

TABLE I.
GROUPING OF CASES.

GROUP	Patients	Dead	Length of life known in	Living	Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
1. Early	65	26	51	27	11	25	3	3.58
2. Operable	142	91	104	24	17	25	26	2.66
3. Inoperable only on account of extension to vagina	87	64	62	5	5	5	28	1.66
4. Inoperable	145	112	105	4	1	3	59	1.08
5. Advanced	36	29	25	—	—	—	21	0.58
Total of all groups	475	322	347	60	34	58	137	—

TABLE II.
RESULTS OF VARIOUS FORMS OF TREATMENT IN EARLY CASES.
GROUP 1

TREATMENT	Patients	Dead	Length of life known in		Living		Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
Surgery	20	9	16		7		6	9	—	4.08
With simple cautery	5	1	5		4		2	3	1	4.0
With radium	11	5	10		6		—	5	—	4.0
With simple cautery and radium	4	2	4	28	2	15	—	2	—	3.75
With Percy cautery	10	4	6		2		1	2	2	2.25
With Percy cautery and radium	3	2	3		1		1	2	—	3.41
Radium only	5	1	3		2		—	—	—	2.58
Percy cautery and radium	3	2	2		1		1	1	—	4.0
Simple cautery	1	—	—		—		—	—	—	—
With radium	3	—	2		2		—	1	—	3.91
Total	65	26	51		27		11	25	3	3.58

sidered, a fairly accurate estimate may be made of the relative values of the methods in different stages of the disease (Tables III, IV, V, and VI).

The point may be raised that these cases are not accurately grouped, else why do we find any cases in Groups 1 and 2 treated by other means than surgery. On account of factors such as obesity, cardiac decompensation, and the personal considerations of the patient, some early cases were treated by radium. On the other hand, the probable accuracy is borne out by the gradually

TABLE III.

RESULTS OF VARIOUS FORMS OF TREATMENT IN OPERABLE CASES.

GROUP 2

TREATMENT	Patients	Dead	Length of life known in		Living		Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
Surgery	26	15	24		9		11	12	2	4.33
With simple cautery	9	7	9	42	2	12	1	1	1	2.50
With radium	6	4	6		2		—	1	—	2.29
With simple cautery and radium	8	1	4		3		—	1	1	2.66
With Percy cautery	27	21	20		4		4	7	3	3.08
With Percy cautery and radium	8	3	3		1		—	1	1	2.33
Radium only	21	16	17		2		—	1	8	1.50
Percy cautery	23	15	14		1		1	1	6	1.66
With radium	2	2	1		—		—	—	—	2.58
Simple cautery	3	2	2		—		—	—	1	0.66
With radium	9	5	4		—		—	—	3	0.75
Total	142	91	104		24		17	25	26	2.66

TABLE IV.

RESULTS OF VARIOUS FORMS OF TREATMENT IN GROUP 3

TREATMENT	Patients	Dead	Length of life known in		Living		Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
Surgery	6	2	4		2		3	3	—	4.33
With simple cautery	4	4	3	10	—	3	1	1	—	2.91
With radium	1	—	1		1		—	—	—	3.91
With simple cautery and radium	1	—	1		1		—	—	—	3.00
With Percy cautery	5	1	2		1		1	1	—	3.75
With Percy cautery and radium	4	3	3		—		—	—	1	2.20
Radium only	39	30	26		—		—	—	15	1.0
Percy cautery	12	11	10		—		—	—	4	1.66
With radium	2	1	1		—		—	—	—	3.50
Simple cautery	6	5	5		—		—	—	3	1.16
With radium	7	7	6		—		—	—	5	0.83
Total	87	64	62		5		5	5	28	1.66

ncreased mortality, the shorter period of life, and the longer duration of symptoms in the higher groups.

Of the eleven patients of Group 1 who lived more than five years, ten were treated surgically. Two of the three treated by radium who have been traced were living three years later. The third lived one and one-half years.

Both of those treated by simple cautery and radium are living; one three years and the other four years after treatment.* It is thus apparent that in early cases the various types of treatment gave similar results; it remains for time to prove the durability of results wherein radium was employed.

In cases in Group 2 (Table III) the Percy cautery and radium yielded approximately the

*In making a special sub-heading for those receiving cautery and radium. I am reducing the number treated by radium reported by Stacy in 1920.

TABLE V.

RESULTS OF VARIOUS FORMS OF TREATMENT IN INOPERABLE CASES.

GROUP 4

TREATMENT	Patients	Dead	Length of life known in		Living		Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
Surgery	3	3	3		—		—	—	1	1.58
With simple cautery	5	3	3		—		1	1	—	3.00
With radium	7	5	6		1		—	—	2	1.50
With simple cautery and radium	1	1	1	16	—	1	—	—	—	2.50
With Percy cautery	5	5	5		—		—	—	2	1.58
With Percy cautery and radium	1	1	1		—		—	—	—	2.50
Radium only	57	42	40		2		—	1	22	1.12
Percy cautery	32	25	22		—		—	—	17	0.70
With radium	11	9	7		—		—	—	3	1.16
Simple cautery	9	8	7		—		—	—	5	0.66
With radium	14	10	10		1		—	1	7	1.24
Total	145	112	105		4		1	3	59	1.08

TABLE VI.

RESULTS OF VARIOUS FORMS OF TREATMENT IN ADVANCED CASES

GROUP 5

TREATMENT	Patients	Dead	Length of life known in	Living	Lived more than five years	Lived more than four years	Died in less than one year	Average length of life, years
Surgery	1	1	1	—	—	—	1	0.91
With Percy cautery and radium	1	1	1	—	—	—	1	0.83
Radium only	11	8	5	—	—	—	3	0.81
Percy cautery	11	9	9	—	—	—	8	0.50
With radium	2	—	—	—	—	—	—	—
Simple cautery	7	7	6	—	—	—	5	0.58
With radium	3	3	3	—	—	—	3	0.41
Total	36	29	25	—	—	—	21	0.58

same early mortality; the former method yielded one five-year cure and the latter one four-year cure. The combination of radium, cautery, and surgery in this group proved equally efficient to, if not slightly better than, surgery alone. The incidence of early deaths is higher, but four of of the seven are living while only nine of twenty-four wherein surgery alone was used survive.

Cases in Group 3 are of special interest. Of the five surviving patients all received surgical or combined treatment. The use of radium as an adjunct gave the best results; when used alone the results were disappointing.

In cases of Group 4, only patients who received radium alone or in combination survive. Seventeen of twenty-two on whom the Percy cautery was used died within the first year; while only twenty-two of forty on whom radium alone was used died in this period.

In cases in Group 5 radium again showed slight superiority over surgery in prolongation of life, only three of five patients died in less than one one year. Its palliative effect is universally recognized.

Fistulas resulted after treatment in forty-six cases, 9.7 per cent. of the entire series. There were twenty-one rectovaginal fistulas, thirty-five vesicovaginal, and there was one vesicosigmoidal fistula. The largest number followed Percy cautery, but this may be due in part to the fact that the abdomen was not always opened to control the uterus and to estimate the degree of heat.

TABLE VII

LENGTH OF LIFE OF PATIENTS UNDER VARIOUS TREATMENT

TREATMENT	Patients	Length of life known in	Living	Living five years		Living three years		Died after three years
				Patients	Per cent.*	Patients	Per cent.*	
Total abdominal hysterectomy	25	24	9	7	30.4	9	39.0	4
Vaginal hysterectomy	29	23	9	7	30.4	9	39.0	4
Amputation of cervix	2	1	—	—	—	—	—	1
Simple cautery and later hysterectomy	15	12	5	3	25.0	5	41.0	1
Simple cautery and immediate hysterectomy	8	8	1	—	—	1	12.0	2
Total abdominal hysterectomy and radium**	15	14	6	—	—	6	43.0	—
Vaginal hysterectomy and radium	10	9	4	—	—	4	44.0	1
Simple cautery and total abdominal hysterectomy and radium	9	6	3	—	—	3	50.0	1
Simple cautery and vaginal hysterectomy and radium	5	4	3	—	—	3	75.0	1
Percy cautery and later hysterectomy	31	25	5	4	16.0	5	20.0	5
Percy cautery and immediate hysterectomy	13	6	1	1	16.0	1	16.0	—
Percy cautery and vaginal hysterectomy	3	2	1	—	—	1	50.0	—
Percy cautery, later hysterectomy and radium	7	6	1	—	—	1	16.0	2
Percy cautery, immediate hysterectomy and radium	10	5	1	—	—	1	20.0	—
Percy cautery only	81	57	2	2	3.5	2	3.5	3
Percy cautery and radium	17	9	—	—	—	—	—	1
Simple cautery	26	20	—	—	—	—	—	—
Simple cautery and radium	36	25	3	—	—	—	12.0	—
Radium only	133	91	6	—	—	6	6.7	4
Total	475	347	60	24	7.0	57	16.6	30

*Percentages in this table are based on cases wherein length of life is known. They thus favor small groups and those from which a large number are excluded on account of insufficient data.

**Radium was first used here in 1915.

Conclusions

1.—In very early cases of cancer of the uterine cervix treatment by surgery alone gives good results. Surgery in combination with radium gives slightly better results than surgery alone.

2.—In operable but not early cases treatment by surgery alone or combined with radium gives the best results. Radium alone or Percy cautery alone are of equal value and both less efficient. If radium is not available, Percy cautery should be used.

3.—In cases considered inoperable because of extension to the vagina surgery gives the best results and radium is disappointing.

4.—In inoperable cases radium, alone or in combination with cautery or surgery, is the only effective agent.

5.—In advanced cases radium is superior to all other methods but not curative.

6.—The incidence of fistula is higher with Percy cautery than with any other method.

Note.—Reports received subsequently credit another three-year cure to radium and an eight-year cure to vaginal hysterectomy in Group 1, and further establish the value of hysterectomy when supported by radium or Percy cautery.

ASTHMA IN CHILDREN

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Introduction.

ASTHMA is characterized by sudden paroxysms of severe dyspnoea, accompanied by some signs of bronchitis of varying degrees and recurring at intervals of varying length. It is difficult to get from the literature any idea of the frequency of asthma in early life on account of the difference of opinions of various writers as to what constitutes real or true bronchial asthma. Dyspnoea of a more or less paroxysmal character is not an uncommon manifestation of bronchitis in infancy and as a result it is very difficult to decide in many such cases as to whether or not they are of a true asthmatic character. The symptoms in many cases may closely resemble the paroxysms of true asthma as seen in adults but from an etiological standpoint the condition is an entirely different one. The dyspnoea is not due to a primary spasm of the bronchioles, but is only a symptomatic manifestation of bronchitis in early life, its paroxysmal character probably being due to the excitability of the nervous system, which so often modifies the symptoms of disease in childhood.

True spasmodic asthma is not a common disease in early life, but it may occur at any age. Ashby met with a case at the age of eight weeks, in which the disease was distinctly familial, the father and an uncle of the patient having suffered from the same complaint. Cautley recorded one case which appeared to have been true asthma, which terminated fatally at the age of eleven weeks. As a rule, however, the affection does not manifest itself until after the age of two years. Reflex irritation may induce spasm of the bronchial tubes but certainly not true asthma. Perhaps the most common example of this is the spasm that results from the presence of adenoid growths in the naso-pharynx. Undoubtedly the removal of these will in some cases cure the tendency to bronchial spasm. It has accordingly been claimed that the removal of adenoid and tonsillar growths will cure asthma but this does not follow unless every case of spasm of the bronchial tubes is to be described as due to asthma. The recognition of this liability of the bronchial tubes to spasm from many diseases and from many sources is of the greatest importance if we are to have clear ideas as to the nature and treatment of true asthma in early life.

Etiology. Until recently, current views as to the etiology of asthma regarded the spasm as most probably a central neurosis of reflex origin. Under this view due prominence was given to the constitutional factor which must always be invoked to explain the occurrence of such a

neurosis in certain individuals only. Undue prominence was given to the various possible sources of reflex irritation, which might act as precipitating causes for the attack. The disease was most generally regarded as due to the combination of a constitutional nervous excitability with reflex precipitating causes. The etiological factors so far as they are known, are the same in children as in adults. In the immediate family history there will usually be found gout, asthma, eczema, migraine, etc., and the various other manifestations of the so-called "Arthritic or neuroarthritic diathesis." In the production of attacks as well as in the cure of the disease, local surroundings, probably the atmospheric conditions, play a great part. The house surroundings, if of an exciting kind, will by disturbance of the digestive tract and nervous balance develop a tendency to asthma in a susceptible child which might have remained latent under a more placid up-bringing. The disease is not confined to any one class of society, although the well-to-do provide a larger proportion of cases and their habits of life tend to the propagation of the disease. The exciting cause of an attack may be unascertainable. In other cases it may be trifling, and would be negligible in a child not belonging to this group of children. A child who suffers from eczema in infancy, frequently will develop asthma or hay fever or cyclic vomiting in later childhood. The first manifestations of asthma very frequently appear during the second year, when the eczema has healed or is about to disappear, a clinical fact which not improperly permits the layman to speak of a "striking in."

The most tenable view as to the etiology of asthma is one which regards the condition as a manifestation of anaphylaxis. The essential feature is that the parenteral introduction into the body of a foreign protein leads to the development of a specific proteolytic ferment. The development of this substance is called "Sensitization" and the ferment is stored in the body cells until activated by a second introduction of the same protein. The rapid splitting of protein which follows a second injection may lead to the liberation of poisonous constituents of the protein. The evidence as to the association of asthma with anaphylaxis may be summarized as follows: It is generally agreed that asthma is due to a stenosis of the bronchioles. It has been demonstrated that in animals dying from anaphylactic shock, the cause of death is a stenosis of the bronchioles. From this viewpoint asthma is a manifestation of anaphylactic shock in an individual who has become sensitized to a particular foreign protein substance. As anaphylaxis is a peripheral phenomenon, asthma is also peripheral, not a central neurosis.

In susceptible children a paroxysm may be incited by high winds, dust, cold and damp air, or by the inhalation of substances such as the pollen of certain plants, especially ragweed, golden-rod and roses. Contact with animals, especially horses, cats and dogs may also and frequently do, incite attacks. It has recently been shown by Schloss and Talbot and also by Walker that as well as these emanations from animals and plants, that certain foods especially eggs and, rarely, milk, pork and other meats are responsible for attacks in certain children. Sensitization to egg albumen and other proteins may be shown by a cutaneous test, performed by scarifying and inoculating the skin in the same way as for the Von Pirquet tuberculin test. The phenomenon of horse asthma, in which the attacks develop when the subjects come into contact with horses has long been recognized. The sensitization of these patients may be shown by a positive cutaneous reaction with either horse serum or horse dander. The association of asthma caused by the pollen of particular plants, with a specific cutaneous reaction to this pollen has been demonstrated by Walker and others. Research is pointing out from time to time that other foreign substances are capable of producing sensitization in constitutionally susceptible individuals. In certain instances the susceptibility to these protein substances is inherited; in others it is perhaps the result of an active sensitization, but in many instances there is no sufficient explanation as to how the child has become sensitized.

Pathology. The opportunity to make post mortem examination, in other subjects than those animals who have died during an attack of asthma is seldom offered. Cases have been reported by Ellis who has reviewed the literature. The pathological picture is not uniform or characteristic of asthma. Redness of the bronchial mucosa, dilatation of the bronchi, and pulmonary emphysema are common. The medium and smaller bronchi are likely to be wholly

or partially occluded by an exudate of mucous, which may contain a granular or an apparently fibrinous material, and intact or degenerated epithelium. Partly wound threads or spirals may also be observed. Polynuclear leucocytes, round, oval or spindle cells with or without eosinophiles and Charcot-Leyden crystals, may also be present. The epithelium of the bronchial mucosa may be intact or desquamated. The pulmonary alveoli may appear normal, dilated or atelectatic. Eosinophile cells were noted in the alveoli of Ellis' case, an adult.

Symptoms.

There are four different clinical types of asthma occurring in infants and children.

1. *Cases which in the beginning resemble acute bronchitis,*—this type is frequently seen in young infants. The onset is sudden with slight fever, incessant cough, dyspnoea, sometimes cyanosis and with prostration and cold extremities. The chest is filled with sibilant and sonorous rales which soon give place to fine crepitations. Contrary to the usual course of bronchitis, the attack subsides very abruptly and it is only by observing recurrent attacks that the diagnosis may be made.

2. *Catarrhal asthma or those following in the course of bronchitis.*

3 *True asthma.* This is not an uncommon form and is frequently classed under the heading of acute spasmodic bronchitis (Rachford and Kerley) or catarrhal spasm of the bronchi. The symptoms are however, indistinguishable from asthma and undoubtedly belong in this classification. This is the type that is more frequently met with in children. The attacks usually begin abruptly with moderate fever although frequently there is no thermal rise. The respiration may vary from fifty to eighty per minute. There is frequently severe dyspnoea, the facial expression is anxious, the infant frequently attempting to cling to anyone. Laborious and prolonged expiration is present whereby all the auxiliary muscles are strained and the active abdominal muscles in particular are severely taxed. The thorax itself is rigid or makes but slight excursions and inspiratory epigastric recessions occur; cyanosis and often cold sweats ensue. Respiration is frequently retarded. In addition to the prolonged expiration, dry, sibilant rales loud enough to be heard anywhere in the room may develop early or later. Auscultation reveals diminished respiratory murmur, with, in addition, numerous sibilant and sonorous, mostly expiratory rhonchi heard over the entire lung. Percussion yields a loud hollow note and will suggest a marked emphysema of the lungs, the border of which may extend to the eighth rib on the right side anteriorly. The pulse is small and usually accelerated. The temperature, on the other hand in pure asthma is normal. During sleep the dyspnoea abates. Cough is frequently absent in the beginning; but sets in towards the close of the attack when the secretion becomes somewhat more loosened, bringing to light in older children a tough, purely mucous expectoration, which in true asthma contains Charcot-Leyden crystals, Curschmann's spirals, and many oesinophile cells.

These attacks of asthmatic bronchitis may continue for three or four weeks, while they are constantly present they vary in intensity from time to time being usually worse at night. The symptoms are always increased by exposure to a cold, damp, atmosphere, by any fresh accession of bronchitis and often by trivial digestive disturbances. The cough is not usually severe and expectoration in most cases is absent in the bronchitic type. With recovery from asthmatic symptoms the emphysema usually disappears gradually, although in severe cases it occasionally is persistent. What proportion of asthmatic bronchitis cases go on to develop true asthma it is impossible to say, some undoubtedly do, but on the other hand many make a complete recovery. In true asthma the attacks may recur every week or so or be almost constantly present; frequently they recur after weeks or months of respite. The condition frequently disappears for years.

Asthmatic bronchitis in children is much more frequently met with than true bronchial asthma. There are individuals in whom every new attack of bronchitis (often febrile) immediately assumes an asthmatic character, i.e., it begins with sonorous rhonchi, moderate emphysema, and increased expiration. These asthmatic symptoms as previously mentioned gradually disappear with the resolution of the dry catarrh. These children frequently suffer from this kind of bronchitis once or twice a year; and in the intervals of freedom they are often somewhat short of breath and frequently have chronic nasal catarrh associated with a large amount of adenoid tissue.

4. *Hay Asthma* is a type of asthma which is

produced by a reaction of the nasal and deeper seated respiratory mucous membrane, to the pollen of various plants, etc. This predisposition is hereditary and is found in family neuroarthritismus. The disease sometimes commences at three to six years as a hay cold, and frequently remained unrecognized during the first years, if the conjunctivitis and the well-known predisposition do not lead to the proper diagnosis. Pronounced hay-asthma occurs as a rule, a few years later.

Diagnosis. Attacks of true asthma are usually easily recognized. The paroxysmal character of the dyspnoea, the prolonged wheezing expiration and the tendency to recurrence, form a sufficiently characteristic clinical picture. A positive diagnosis can almost invariably be made by an examination of the blood. In this condition the essential feature is an increase in the eosinophile cells. They average about ten to twelve per cent. of the total cells but may reach as high as twenty-eight per cent. (Holt). The examination of the sputum is only of importance in older children suffering from typical adult asthma; in these instances Curshmann's spirals and Charcot-Leyden crystals are present. The various forms of paroxymal dyspnoea seen in children are excluded principally by an examination of the blood. This, combined with repeated observations of the attacks, is the only means at our disposal of distinguishing true asthma from spasmodic bronchitis or bronchopneumonia in children. "Cardiac Asthma" and "Renal Asthma" have rarely to be considered in differential diagnosis. The spasms of the larynx seen in catarrhal laryngitis, produces paroxysmal dyspnoea inspiratory in character, associated with this however, is an inspiratory stridor and one will note the absence of rales in the chest. Thymic asthma is a condition associated with paroxysmal dyspnoea, but in it the prolonged wheezing expiration is absent, the breathing is not so labored, and the characteristic blood picture is not present.

Prognosis. The prognosis as regards life is good, provided that the patient can be well protected from the development of chronic bronchitis and emphysema. The prospect of a complete cure depends probably upon the ability to desensitize the patient to the particular plant, food, animal or bacterial protein or better still the removal of the particular protein from the diet or surroundings of the child. It is quite possible to take a hopeful view, and say that the young infant or child will "grow out of it." This may happen, more especiaaly in those cases in which the family tendency to the disease is not marked, and in which a spasmodic tendency has been manifested in the child in other ways. Very often, as the child grows, the tendency to asthma dies down, but only to be replaced by some neurosis, such as migraine, periodic vomiting or erythaema, especially is this true if they have not been desensitized properly to the particular causative agent.

Summing up then, the younger the child, the shorter the duration of the disease; and the less marked the hereditary tendency, the better the prognosis. In those children that are sensitive to the pollen of plants and to certain food stuffs there is reason to believe that specific treatment by immunization may be of benefit. The results with hay fever have been encouraging and Talbot was able to prevent or diminish greatly the attacks in some of his patients, especially those who were sensitive to egg.

Treatment—Until the last year or two we have known of nothing specific for asthma. Further study of anaphylaxis in the condition and in the same condition in animals may lead to more successful therapy. Heretofore the disease appeared to run its course but little influenced by the numerous measures suggested for its relief. New methods apparently successful in isolated or small groups of cases have repeatedly found a place in the literature, only to be replaced by other and still newer measures. A drug which appears at one time to have afforded relief may utterly fail at the next trial in the same or another patient. The more distressing features of the paroxysms can often be relieved by medication.

The tendency of modern medicine is to study the cause and the condition upon which pathological processes are based rather than burden the student with a long list of drugs with which to treat an illness. No disease can be treated intelligently without a clear understanding of its pathology and etiology and of the physiology of the patient. Asthma, like other diseases, was treated symptomatically and empirically until recent advances in medicine made it possible to determine its cause. The pathological explanation of asthma in childhood applies only to a small group of cases. The great majority have to be explained by other means. The treat-

ment may be most conveniently dealt with under two headings.

1. *The attack.*—Inhalations of the fumes of nitre paper or stramonium leaves is the measure which should ordinarily be used in the acute attack. Most of the proprietary "Asthma Cures" contain these ingredients. The room in which the child is sleeping may be filled with the fumes or if a still greater effect is essential the fumes may be introduced into a regular croup tent. The cold air treatment in bronchial asthma is distinctly contraindicated regardless of the age of the patient. Warm, moist air at from 68° to 70° is best. A sudden blast of cold air may be sufficient to increase the severity of the paroxysms to a marked degree. Ventilation, however, is a necessity in these cases. The best means of obtaining it is by the use of two rooms, one of which may be aired while the other is occupied. Before the child is changed to the aired room its temperature should be raised to that of the other. Mustard plasters so applied as to envelop the entire thorax will often relieve the spasm sufficiently to reduce the respiration. The mustard should remain on long enough and be of sufficient strength to produce a good skin reaction. It is not necessary to repeat it more often than every three hours. When the attack is severe and accompanied by severe dyspnoea, adrenalin chloride (1-1000) 5 to 10 minims should be given hypodermically. The effect is almost instantaneous but unfortunately tends to pass off rapidly so that it may have to be repeated within an hour or an hour and a half.

It is rarely necessary to use either morphine or codeine in the management of asthma in children, for it so happens that the spasms are usually controlled by the use of epinephrin and by local applications. Many writers believe that the nocturnal attacks can be avoided or lessened in severity by giving at bedtime one of the nervous sedatives such as antipyrin or bromide. Personally, I have had little or no success with this form of therapeutics but there is no objection to trying these drugs in doses proportionate to the age of the child. In order to avoid all possible sources of reflex irritation the physician should make sure that the bowels are thoroughly open and if any doubt exists on this point, an enema should be given at the beginning of the attack, and the bowels should be kept open during the subsequent period.

General treatment of the disease. In 1910, Meltzer suggested that bronchial asthma might be due to anaphylaxis, because of the striking similarity of its clinical symptoms in man to those in animals rendered sensitive by injections of small doses of protein. Before any further advance could be made in the subject, a safe method of determining whether a patient was hypersusceptible to a foreign protein had to be devised. In 1873 Blackley found that pollens caused a reaction on the scarified skin of individuals suffering from hay fever. The importance of this observation was not recognized or applied until recently. In 1912 Schloss described skin reactions obtained with egg protein in patients susceptible to eggs. This method has been adopted by Talbot and in employed as follows:—A linear scarification is made about one half inch long and only deep enough to penetrate the outer layers of the skin, care being taken not to draw blood. Another scarification is made as a control, since it is a well established fact that mechanical injury to the skin may result in a pseudo-reaction (an elevated white area surrounded by a small roseola) especially in patients with an "exudative diathesis." The scarification is then inoculated by applying the material to be tested, preferably in fresh solution and allowing it to remain there for twenty minutes. In some instances, however, reaction may be delayed and may not appear for one or two hours. It may be described as an urticarial wheal with an irregular outline surrounded by a pink blush, both of these phenomena being absent in the control. In some cases the blush, without the urticarial wheal is so pronounced and characteristic that there is no question about the reaction. Itching may or may not be present. A positive reaction usually disappears within one-half to two hours. The more delicate the skin the more readily will a foreign protein pass through it, and if the patient is sensitive, will cause a reaction. An infant's skin reacts very readily and even when unbroken is capable of absorbing the foreign protein in some instances. The skin test is specific, and indicates sensitization to the protein tested if the protein used in the test is free from chemicals, and therefore not in itself irritating to the skin, but at the same time maintains its protein characteristics. Information derived from such a test may be of the greatest aid in determining the cause of bronchial asthma. According to

Talbot, asthma and its allied conditions have naturally divided their cause into three groups as follows:

1. Inspiratory type due to—
   - a. Hay fever—pollens of various grasses.
   - b. Animal emanations.
     - (1) Horse, dog, cat's hair, dust.
     - (2.) Bird's feathers.

2. Ingested type due to—a, meat; b, milk; c, eggs; d, grains, oats, wheat, etc.; e, vegetables, peas, beans, potatoes, etc.; f, fruits, oranges, banana, etc.; g, nuts, walnut, pecan, etc; h, fish, salmon, etc.; i, shell fish, lobster, crabs, clams, etc.

3. Bacterial type. The occurrence of the different types of asthma varies with the age of the patient. Infants and young children are only sensitive to ingested proteins, such as milk and eggs and other common articles of food. This type gradually becomes less common as the individuals grow older, as there is a tendency for natural immunity to develop with age. On reaching puberty sensitization to foods either becomes relatively uncommon or the patient learns by experience to avoid certain articles of food which are apt to disagree. Inspiratory asthma, on the other hand, is not found before the third or fourth years of life, and becomes more common as the patient reaches puberty. Bacterial asthma is relatively rare in children, but becomes more common in adult life. The treatment of bronchial asthma depends upon the type of asthma, the exposure and the severity of the symptoms. If the asthma is of the ingested type the bowels should be cleared out by calomel, milk of magnesia or salts. Such a procedure will remove the immediate cause of the attack and thus shorten the duration. Permanent cure can only be attained by finding and removing the cause. This may be done by means of a very careful history and by the skin test described above. The proteins may be prepared according to the methods of Walker and Woodhouse, although pure untreated proteins give usually satisfactory results.

Inspiratory Asthma. Patients suffering with hay-fever may either be immunized by subcutaneous injections of the pollen extracts to which he is sensitive, a procedure not without danger except in the hands of an expert, or he may seek a locality free from the offending weed, plant or tree thus avoiding exposure during the flowering season. The same applies to horse asthma. If immunization is not practiced the patient should be excluded from all emanations from the horse such as horse hair, mattresses, etc.

Ingested Asthma. Asthma due to foods is more difficult to deal with than the inspiratory asthma, since it is not always easy to eliminate entirely an article of food from the diet without starving the child or making the diet monotonous. Eggs are the most common cause of this type of asthma on account of their extensive use in cooking, and since minute quantities are sufficient to cause an attack of asthma, careful planning is necessary to give a child an egg-free diet. The following foods usually or always contain eggs; custard, cakes, frostings, cookies, many ice-creams, puddings, some crackers and macaroni. The difficulties of keeping eggs entirely out of the diet therefore, makes it necessary to induce an artificial immunity according to the method of Schloss. This is done by giving the child minute doses by mouth of dried egg white powder in gelatin capsules. The initial dose of egg, which is usually one milligram is gradually increased until the patient receives from eight to twelve grams of egg powder a day. By the time the dose is as high as three or four grams of egg a day the severity of the asthma has usually diminished, the child begins to gain in weight, and looks more like a normal child of its age. Immunity which occasionally is permanent is established when the skin test becomes negative. Not infrequently, however, after the immunizing doses of egg are omitted, the symptoms and a positive skin test return. To prevent this, the usual technique, according to Talbot, is to give the maximum immunizing dose during the first week of every month for at least one year after the child is immunized.

Idiosyncracy to beef juice or the other meats is handled by excluding the offending meat from the diet. Fortunately idosyncracy to beef juice tends to cure itself in a few months without treatment if the beef juice is omitted from the diet.

Idiosyncracy to the vegetables but more especially to the grains is difficult to treat because if all the grains were excluded from the day's food it is almost impossible to give enough carbohydrate for a well balanced diet. In most cases it is wise to exclude entirely the offending food. Biologically the vegetable proteins are closely

related to one another, so that a child who is sensitive to the protein of the string bean will often react to the other members of the bean family, that is to the lima bean, pea bean, black bean, etc. The same is true of the grains, wheat, barley, oat, rye, etc., which belong to the grass family. When positive reactions are obtained from the seeds of the grains, the pollens of the grasses may also react.

Milk forms such an important part of a child's diet that it is very difficult to exclude it entirely. Individuals to whom raw milk is a poison may be given boiled milk or buttermilk with good results. Sometimes it is necessary to produce immunity to cow's milk by giving drop doses of the milk, gradually increasing the amount and obtaining immunity in the manner described for eggs. The remaining foods, fruits, nuts, fish, and shell fish will not be missed, if they are excluded from the diet.

Climate. With the new conception of the etiology of asthma it will scarcely be necessary to seek this form of relief unless it be to avoid the particular inspired protein or to cure the frequently associated bronchitis. An assurance of relief cannot be promised for any climate, and yet a change of location is sometimes successful in preventing recurrences. City is often better than country life. A change from one place to another near by may be as beneficial as a change to a resort far away. Patients whose financial condition will permit may well try one location after another. In general a mild and equable climate is to be preferred, and Florida, Southern California, the Riviera and Egypt may be favorable for poorly nourished and neurasthenic patients: some may be benefitted by a stay in a well regulated sanitarium.

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Effect of Quinidin on Striped Muscle.—Experiments made by J. G. Brody, Cleveland, with frog's gastrocnemius or sartorius, immersed in dilute quinidin solutions, show the following variations from the corresponding normal muscle (immersed in unpoisoned Locke's solution): (1) The height of contraction is diminished. (2) With tetanizing current, the peak of contraction is not so well sustained. (3) The muscle ceases to respond to any stimulus much sooner than the ocrresponding unpoisoned muscle. (4) Load fatigues it more easily. (5) About ten stimulations a second cause a completely fused tetanic contraction in normal muscle; but with the quinidin muscle, the fusion is usually incomplete, no matter how frequent the stimulation, and becomes less and less complete the more the muscle is fatigued or loaded. (6) The quinidin muscle, therefore, responds intermittently to a tetanizing current. These effects can be conceived as depression of the muscle; slow recovery of excitability, and consequent failure to respond to rapid stimulation, until the muscle has rested; therefore, intermittent response to frequent stimulations, the rhythm of the contractions depending not on the frequency of the stimulation, but on the rate of recovery of the muscle. In consequence of the rest, the contractions are strengthened. This seems to furnish a plausible explanation of the effect of quinidin on auricular fibrillation.—*Jour. Am. Med. Assoc.*, July 29, 1922.

MERITS OF INTRAPERITONEAL INJECTIONS IN INFANTS

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THE parenteral injection of fluids has always been a rather difficult procedure and one often attended with a certain amount of risk. Until recently we have been dependent upon subcutaneous or intravenous routes. While hypodermoclysis is a ready means of introducing fluid, the rate of absorption is slow and only comparatively small amounts can be introduced at one time. Intravenous injection involves a difficult technique on account of the small size of the veins and here too, the amount of fluid that one can safely inject is small. The need of some ready means of injecting considerable amounts of fluid into tissues or cavities where rapid absorption is assured has long been felt, and, if one may judge from reported investigations, the intraperitoneal route meets these requirements.

The highest rate in infant mortality is found in diseases associated with marked dehydration, the summer diarrhoeas for example. It is in these cases that we frequently meet with the problem of introducing into the circulation large quantities of water to combat fluid loss. The sunken eyes, sunken abdomen, depressed fontanelle and inelastic skin all direct attention to the extreme desiccation. With these symptoms there is high fever, rapid and feeble pulse and respiration; not infrequently the infant is in a stuporous condition. Even water is rejected by the stomach so the infant receives no fluid to compensate for the loss of tissue-fluids caused by the diarrhoea.

Despite the fact that no food is entering the digestive tract the body chemistry goes on and there is increased metabolism as a result of the restlessness and high fever. The fuel must be obtained from the stored-up foods in the body, the glycogen and the fats. If the disease goes on there is finally a destruction of the proteid tissues. The dehydration results also in a concentration of the solids in the blood and a decreased blood volume. There also occurs an excessive loss of alkalies, especially potassium and sodium. The kidneys are unable to perform their function properly on account of the concentration of the blood and so toxic products accumulate and are absorbed. This diminished alkalinity together with the accumulation of toxic acid products may lead to a condition of acidosis. The high temperature is probably the result of a combination of causes; the toxic absorption, the increased metabolism and the dehydration.

In these cases an essential feature of treatment is the early administration of water. Ordinarily we have at our disposal five methods: 1. By mouth. 2. By bowel. 3. Subcutaneously. 4. Intravenously. 5. Intraperitoneally. The vomiting prevents the administration of fluid by mouth and the bowel is in such a condition of intolerance that rectal injections are of little value so that we must inject the fluid into the veins, under the skin or into the peritoneal cavity.

Subcutaneous Injections. Hypodermoclysis is always painful. In these cases where we have extreme desiccation there is usually a varying amount of shock and it is questionable whether we are justified in submitting such a child to the pain of multiple punctures for the sake of introducing four or five ounces of fluid into the tissues.

Intravenous Injections. Until the suggestion of employing the superior longitudinal sinus was first proved practical, intravenous routes were little used on account of the difficult technique. The veins are small and hard to enter but easy to penetrate. In wasted infants, on account of the diminished blood volume, the veins are in a semi-collapsed condition and the difficulty is increased. Entering the longitudinal sinus presents certain difficulties; there is always the possibility of infiltrating the tissues outside the vein if the needle becomes dislodged or transfixes the vein; even in the most skillful hands this method is painful. The rule that one-sixtieth of the infant's body weight may be injected is generally accepted.

Intraperitoneal Injections. That absorption

takes place from the peritoneal cavity has long been recognized but it has only recently been shown that large quantities of fluid are absorbed sufficiently rapidly to make this an effective means of introducing fluids into the system.

In 1914 Dandy and Rowntree injected dye solutions into the peritoneal cavities of dogs and found the dyes appearing in the blood stream in from two to four minutes and in the urine in from four to six minutes. In 1918 Blackfan and Maxcy first advocated the employment of the intraperitoneal route for the administration of fluids to dehydrated infants. Since that time much experimental work has been done to prove the safety and practical value of intraperitoneal injections.

Technique. For injection a syringe or funnel and rubber tubing may be employed, the former being easier to manipulate. As a precautionary measure the urinary bladder should be palpated. The midline below the umbilicus is the customary point of entry but any part of the abdominal surface may be chosen provided there is no solid viscus underlying it. A needle with a moderately blunt tip may be employed although it has been proven that it is practically impossible to perforate the bowel by the sudden insertion of a needle. The use of too large a needle is often followed by troublesome oozing at the point of entry. As a rule about four to eight drachms per pound body weight may be injected in babies under one year. If distention be marked a smaller amount may have to be employed and extreme distention contra-indicates any introduction of fluid. It is never advisable to inject more than ten ounces at one time. During injection the respiration and circulation should be carefully watched and the introduction of more fluid stopped if any embarrassment occurs. After the injection there may be cyanosis and other symptoms of undue pressure if too great an amount of fluid has been introduced. This can usually be relieved quite readily by reinserting the needle and withdrawing a sufficient amount of fluid to lessen the pressure. Injections may be repeated twice daily. If small amounts are used and absorption is rapid this interval may be shortened. The disappearance of the abdominal distention which usually follows the injection indicates that absorption is sufficiently far advanced to permit a second injection. It is generally admitted that absorption is complete at the end of twenty-four in the average case. Injection is often followed by a slight rise in temperature, probably due to what has been termed a sterile inflammation since stained smears of fluid aspirated after injection show that there is an inflammatory reaction of the peritoneum (a chemical peritonitis).

The solutions employed vary with the indications; those most used are: Normal saline solution, 6 per cent. dextrose in normal saline, 6 per cent dextrose in distilled water, 2 per cent. sodium bicarbonate solution, and 2 per cent. sodium bicarbonate solution with dextrose. Milk has been injected by some workers and others have tried the injections of oils but definite data on these experiments are not available.

Death Following the Administration of Thymol.—Milford E. Barnes, Bangkok, Siam, reports two fatal cases following the administration of thymol for the relief of hookworm infestation. The majority of patients treated with thymol show some signs of its toxic action, such as flushed face, slight dizziness, and drowsiness. The symptoms usually disappear rapidly after the administration of the final purge. In some countries the drug is dispensed to the patients, who are permitted to take it in their own homes without medical supervision. This practice is not followed in Siam, where the entire course of treatment is personally administered by the medical officer in charge or by his trained dispensers. These rules have been adopted for the administration of thymol: (1) A preliminary small dose of magnesium sulphate is taken by the patient the evening before treatment. (2) No breakfast is permitted on the day of treatment. (3) At 7 a.m., 20 grains (1.3 gm.) of thymol mixed with an equal amount of lactose is administered in capsule. (4) At 9 a.m., an additional dose of 20 grains of thymol is given. (5) At 10 a.m., a final purgative dose of magnesium sulphate in hot water is administered.—*Jour. Am. Med. Assn.*, Sept. 16, 1922.

SEPTIC ABSORPTION IN DIFFUSE SEPTIC PERITONITIS

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IN septic peritonitis septic absorption determines the life or the death of the patient, and it is absolutely necessary that this vital process be thoroughly understood. We must know definitely how and through what structures the septic products of peritonitis enter the blood stream, in order that the treatment based on this knowledge may give better results. The theory of septic absorption from the peritoneal cavity has been the outcome of extensive experimentation by numerous observers working through many years. Practically all the experimental work has been with a view to the establishment of the normal channels of absorption. The general method adopted has been to inject certain fluids into the peritoneal cavity of a normal animal through the anterior abdominal wall, and then to study the avenues of absorption. The fluids included saline, soluble dyes, colloid silver, lamp black, bacteria, milk, Chinese ink, blood, oil, egg yolk, etc., and the animals employed were frogs, guinea-pigs, rabbits, cats and dogs.

In 1863 von Recklinghausen[1] found that such fluids as milk, Chinese ink, egg-yolk, oil and blood passed into stomata of the diaphragmatic lymphatics. Schweigger-Seidel[2] in 1866–7 made similar findings. Tourneux[3] in 1874, and Ranvier[4] in 1875, failed to find such stomata. Kolossow[5] in 1892 denied their existence. Beck[6] in 1893 found that blood was absorbed through the thoracic duct. In passing, I wish to point out that numerous anatomical variations occur in the thoracic duct, according to Piersol[7] and that a single duct opening into the venous system at the juncture of the left subclavian and jugular veins does not always occur. Muscatello[8] in 1895 failed to find diaphragmatic stomata. Durham[9] in 1897 found that free bacteria were rapidly absorbed through the diaphragm into the anterior mediastinal glands. In 1903 MacCallum[10] definitely showed that the leucocytes were responsible for absorption through the diaphragm into the anterior mediastinal glands. He also demonstrated that granules were able to pass between tissue cells at points. Hertzler[11] in 1903 described the encysting in the peritoneum of particles of lamp black. Buxton and Torry[12] in 1906 upheld Durham's findings. Dandy and Rowntree[13] in 1913 concluded that the diaphragm plays no special rôle in absorption as they found involvement of the abdominal as well as the mediastinal glands, after injecting a solution of carmine with suspended particles into the peritoneal cavity. Thiele and Embleton[14] in 1914 regarded absorption through the mediastinal glands as quite secondary. They found rapid absorption through the thoracic duct. Bolton[15] in 1921 concluded that large molecules are absorbed through the diaphragmatic lymphatics into the anterior mediastinal glands, and thence to the right lymphatic duct.

These findings have to do mostly with the lymphatics, and are so conflicting that one gains the impression that the problem is still unsolved.

Absorption into the blood stream through the subperitoneal capillaries has been studied as widely. Starling and Tubby[16] in 1894 studied this problem by injecting saline with diffusable dye into the peritoneal cavity through the anterior abdominal wall, and with a catheter in a ureter and drainage from the thoracic duct, found the urine stained in five minutes and the lymph in half an hour. Orlow[17] in 1895; Hamburger[18] in the same year; and Dandy and Rowntree[13] in 1913, confirmed these findings. Bolton[15] in 1921 found that colloids pass slowly into the blood. Poisonous or other substances, whether formed by bacteria or otherwise, may be directly absorbed into the blood, provided they are not large molecules.

From this experimentation one would conclude that absorption occurs directly into the blood vessels from the peritoneal cavity and into the lymphatics of the diaphragmatic region. Experiments in the past have a point of possible error which may account for the diversity of the findings; it is the mode of introduction of fluids into the peritoneal cavity. The peritoneal cavity is a potential space, and fluid injected into it,

provided the quantity is not in sufficient amount to distend the whole cavity and the cavity is not opened, acts in the same way as when injected into tissues elsewhere. It becomes encysted. When the great omentum forms a more or less complete apron covering over the intestines in front, as it does in the dog or cat, an injection of fluid through the anterior abdominal wall will form a cyst corresponding in size to the quantity of fluid injected. The cyst has the parietal peritoneum for its anterior boundary, and its posterior boundary is the great omentum, while the peritoneal cavity proper remains uninvolved for a considerable period of time. Obviously, in such a condition, absorption is upwards towards the diaphragm. This fact was demonstrated in a dog studied before a fluoroscope. Fifty centimetres of a twenty per cent. solution of sodium bromide was injected through the middle of the right rectus muscle, into the peritoneal cavity of a fox terrier, while the dog was held in the dorsal position before a fluoroscope. The fluid was seen to form a round cyst immediately under the abdominal wall, and notwithstanding the movements of the dog the cyst remained unchanged over a period of fifteen minutes. The accuracy of the injection was verified by opening the abdomen. Besides this possible error in the experimentation, there is also the fact that in the presence of a peritonitis the normal processes of absorption appear to be altered. Hertzler[19] states that an abundant fibrinous exudate all but stops absorption. Wegner[20] in 1877 found that intra-abdominal pressure increases absorption, provided it be not sufficient to retard the return blood flow.

In view of the diversity of experimental findings, the possible error in the introduction of the fluids employed, and the uncertainty of the applicability of the routes of normal absorption to the conditions which pertain in diffuse septic peritonitis, more convincing experimental facts are required. In an attempt to solve this problem and find the channel of septic absorption I have carried out a series of experiments on dogs in the laboratories of the Committee on Medical Research in the University of Toronto. It was decided to first set up a diffuse septic peritonitis and then study the absorption which led to the death of the animal. Dogs were employed on account of the similarity between the abdominal anatomy and that of the human, and also because of the size of the thoracic duct. The appendix was chosen as the organ in which to start the pathological process, as in diffuse septic peritonitis it is most often the starting point of the disease. The first step in the experimentation consisted in establishing a set method of producing a fatal peritonitis. When it is possible to produce a uniform pathological lesion which results, in each case, in a fatal peritonitis it is then possible to judge the efficacy of any subsequent experimentation which prevents such a fatal termination. Such a method of causation would be acceptable as a lethal standard. The lethal standard was found in a series of seven dogs. The abdomen was opened under ether anæsthetic and the appendix exposed. A double chromic catgut ligature was tied firmly about the base, and a second about the meso-appendix, completely cutting off the blood supply to the organ. The appendix was then returned and the abdomen closed. Nothing further was done and all the dogs died in about forty-eight hours. The post-mortems revealed that death was due to acute toxaemia. The appendix had become gangrenous, and before sufficient walling off could take place, had ruptured into the peritoneal cavity. There was a diffuse septic peritonitis with abundant bloody exudate. The thoracic duct fluid simulated in color that found in the peritoneal cavity, and contained free bacteria peculiar to the dog, leucocytes and endothelial cells filled with bacteria, crenated red blood cells and debris. This finding determined the character of the subsequent experiments. The plan for the second series of experiments was to induce peritonitis by ligating the appendix, then to expose the thoracic duct and ligate it also, so as to block that possible source of septic absorption. This series consisted of eleven dogs, and the following procedure was carried out in each case: The dog was prepared in the usual way for an aseptic abdominal operation and for exposure of the thoracic duct at the root of the neck. Ether was given to the surgical degree and the abdomen opened through the right rectus. The appendix was found and the stump and mesoappendix ligated separately with chromic catgut. The appendix was then returned and the abdomen closed. A dry gauze collodion dressing was applied. A four inch vertical incision was then made along the posterior border of the left sterno-mastoid, extending about one inch below the upper border of the

left pectoralis major. The latter muscle was divided to that extent. The sterno-mastoid was retracted inward, exposing the jugular vein, which was drawn outward. The carotid artery and vagus nerve were held inward, and the oesophagus followed downward until the thoracic duct was encountered. A strand of plain catgut was used to ligate the duct. A single piece of plain gauze was inserted down to the point of ligation. The pectoralis was restored and the wound loosely closed. A dressing was applied to provide for drainage. The operation was done almost entirely by blunt dissection to avoid bleeding, and care was taken not to dissect so deeply as to enter the mediastinum.

The first dog recovered and was normal in three weeks. At the end of seven days, when the abdominal symptoms were subsiding the abdomen was again opened, and the presence of a resolving diffuse septic peritonitis verified. Small particles of tissue, mixed with a purulent exudate and scattered throughout the peritoneal cavity, were all that remained of the appendix, and the stump of that organ was closed over by a piece of omentum. The abdomen was then closed and the dog made an uninterrupted recovery. Three other dogs of this series recovered, nothing being done after the first operation, except the removal of the gauze in the neck. In the four dogs which recovered it was noted that a fistula of the thoracic duct had occurred, allowing of free drainage of lymph from the neck wound. The character of the lymph draining from the duct could not be ascertained on account of the septic condition of the wound.

In those which died the post mortem revealed a number of causes of death. The most noteworthy fact was that not one of them had developed a fistula of the thoracic duct. The causes of death may be classified in the following way:

1. Surgical emphysema and the shock of the double operation. When the mediastinum was entered at the time of the operation surgical emphysema rapidly spread down toward the diaphragm, compressing the thoracic organs. In one case it spread down to the pelvis retroperitoneally.

2. The establishment of a collateral flow of lymph. It was found that a collateral flow of lymph is readily established. The exact course was impossible to determine.

3. An error in ligating the duct. In one case it was found at post mortem that a large branch from the head and neck had been mistaken for the duct.

In a third series of seven dogs the attempt was made to overcome these causes of death. As all of the cases which recovered showed a fistulous thoracic duct, this fact was utilized to prevent the infective material from entering the blood stream and at the same time to drain it from the system. Next, to prevent or lessen the shock, the operation was divided into two stages. On the first occasion the appendix was ligated. Twenty-fours later the duct was exposed and a fistula established. The procedure was as follows: Under ether anæsthetic the appendix was ligated in the usual way and the abdomen closed. Twenty-four hours later the dog was again anæthetised and the thoracic duct exposed and ligated. An opening was then made in the duct on the abdominal side of the ligature. The ligature was left long and the ends brought out and attached to the skin so that later, if lymph clots occurred at the opening of the duct, gentle traction on the ligature would tend to dislodge them and keep the duct draining. The wound was lightly drained with plain gauze and partially closed.

Three dogs recovered. They all had duct fistula. Of the remaining four three died from a collateral flow of lymph, the operation failing to produce a duct fistula. The fourth died from pneumonia resulting from aspiration of vomitus at the second operation. In the dogs which recovered, drainage from the duct usually stopped gradually during the second week, the wound then quickly healed and the dog rapidly gained the weight lost as a result of the fistula. The thoracic duct was examined after a period of two months and a collateral circulation found in the lymph stream below the site of operation.

The pathology and bacteriology found in the second and third series was fairly constant. The appendix had become gangrenous and had ruptured before sufficient walling off had taken place to convert it into an appendiceal abscess. A diffuse septic peritonitis had occurred in about forty-eight hours. The peritoneal fluid was found to contain a great variety of bacteria, leucocytes, endothelial cells and tissue debris. The lymph glands from the root of the mesentery were loaded with bacilli; showed intense inflammatory changes; and there were many leucocytes and endothelial cells present. The thoracic duct contained fluid resembling that in the peritoneal

cavity, both in the gross and microscopically. The duct fluid when incubated for forty-eight hours, teemed with bacteria, usually a rod-shaped bacillus predominating, and the leucocytes and endothelial cells were becoming colonies of growth. The blood culture from a fatal case was positive while that from a recovery was negative. The liver was acutely congested, but culture from the liver tissue was negative. The adjacent organs were all acutely congested. The small intestine showed extensive inflammatory involvement. The lymph nodules of the lower ileum had enlarged to a great extent, sending prolongations into the lumen between the epithelium. These prolongations harbored colonies of rod-shaped bacilli which were not seen elsewhere on the epithelium. These colonies were seen to extend up into the lymphatic tissue beyond the epithelial coat.

Summing up the results of the experimentation, we find that seven dogs recovered after the production of the fatal peritonitis by successfully causing a duct fistula and thus preventing the lymph from entering the blood. They recovered, in spite of the fact that the cause was not removed and no resort was made to abdominal drainage. The infection in the peritoneal cavity had no outlet, save through the duct, and when this outlet was available the result was recovery. If a fatal septic absorption could occur directly into the blood through the subperitoneal capillaries, or through the diaphragmatic lymphatics and thence through the right lymphatic duct into the blood, these dogs which recovered would have died, for nothing was done to prevent such absorption.

The practical application of these findings has yet to be worked out. It would seem that the first procedure, after a diagnosis of diffuse septic peritonitis had been made, would be to establish a thoracic duct fistula, and at a later date whatever other operative measures which the situation warranted. The operation could be done with greater facility in the human than in the dog, as the duct is more accessible and, being larger, could be more successfully drained. The emaciation could be combatted by blood infusions or transfusions. By checking the septic absorption, those distressing complications which are met so frequently in peritonitis would be largely overcome. The conclusion to be drawn from this experimentation is that in diffuse septic peritonitis death travels through the thoracic duct.

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Treatment of Hyperemesis Gravidarum by the Duodenal Tube.—The deduction drawn by Charles E. Paddock, Chicago, (*Journal A.M.A.*, May 27th, 1922) from his case are that, by the applied use of the duodenal tube in early stages of hyperemesis gravidarum, the necessity for emptying the uterus for this disturbance may be reduced to a minimum. This method of treatment not only relieves the concern about the loss of life to the mother, but secures the life of the fetus as well. While, in the treatment, the passing of the tube is comparatively simple, still, to insure the best and quickest results, the co-operation of the patient with the physician is necessary. After the tube has settled into place—it takes from four to twenty-four hours—the rest of the cure is simple. The principal indications for the use of the tube are the loss of weight (due to starvation) or the dehydration of the tissues, in other words, the depleted condition that arises from excessive vomiting, of hyperemesis gravidarum.—*Jour. Amer. Med. Association*, July 22nd, 1922.

POST-OPERATIVE MANAGEMENT*

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THERE has always been an impression among practitioners that once an operation is completed, fully seventy-five per cent of the surgeon's worry is over. Only those physicians who have had the post-operative care of a troublesome case will realize how far this is from being correct. This phase of our surgical therapy has been sadly neglected in undergraduate teaching, so much so that a large number of us when we graduated have had but a hazy idea of what to do, let alone make a diagnosis of our patient's difficulties.

Success in surgery depends on three things; surgical diagnosis, surgical technique, and post-operative care. All three perfected tend to lower mortality rate. To-day we shall endeavor to lay down some fundamental principles in respect to the last of these. There is, first of all, one axiom that I would like to state as follows: It is much easier to prevent post-operative complications than it is to cure them. With this as our ideal, we have been able to revolutionize our post-operative care.

There are three main troubles that are apt to beset every abdominal case; 1. Pain. 2. Distention. 3. Nausea and vomiting.

In regard to the treatment of post-operative pain, there is in our opinion only one answer, and that is enough morphia to keep the patient free from pain and restlessness. This may require ¼ grain with atropine 1-150 grain for the first twelve hours, or it may require three times that much. Patients differ so much in nervous temperament and susceptibility to pain. However, keep them free from pain for the first twenty-four hours, and little morphia will be required thereafter, unless the case is one of general peritonitis, when much more will be required. If the patient complains of pain in the second twenty-four hours, one should investigate the cause of the pain before ordering morphia indiscriminately. Pain in this period may be due to pylorospasm, which is readily relieved by atropine; to a distended bladder which may be relieved by an enema or catheterization, preferably the former; the pain may be of pleuritic origin, or finally, distention, which can be relieved by heat locally and other measures, such as the various enemata.

Distention, or the second difficulty, can be prevented absolutely in eighty per cent of cases. The essentials tending towards prevention are, digitalis per rectum immediately after operation, morphia to relax rectus spasm and allow of painless contraction to expel gas, and strychnine; and lately to the armamentarium we have added sodium bromide. The question arises, why give digitalis per rectum? We have only one answer, and that is that it surely does prevent distention in some way; a case of "rational empiricism." For the rest, we can only theorize that it has (1) a direct action on the unstriated muscles, (2) an action on the vagus nerve, (3) it puts general tone into the whole cardio-vascular tree. The last seems as likely as any, since shock, with its consequent venous engorgement, must be one of the underlying factors in inducing the condition. Strychnine we use for its action on the smooth muscle fibres, and the bromide as an additional sedative. Therefore we prevent these two post-operative troubles, pain and distention, with the following routine order, to be used in practically all abdominal cases:

Atropine gr. 1-150
Morphia gr. ¼ } p.r.n. for pain.
Strychnine gr. 1-30 q.4.h. for 48 hours.
Murphy Drip oz. 6 of glucose 10% and concentrated tr. digitalis drm. 1½ (B. & W.), and sodium bromide gr. 80.

We are insistent no purgative be given within the thirty-six hours prior to operation, and that patients receive abundance of fresh cold water. We are not enthusiastic about ice water. We absolutely forbid ginger ale, orangeade, or grape juice, feeling that these only add to the patient's discomfort. It is a habit with some nurses to

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be too enthusiastic regarding enemata. Use enemas only when necessary.

In order to treat nausea and vomiting, it is essential to diagnose the type. There are five types: (1) anaesthetic, (2) gastric dilatation, (3) obstructive, (4) neurotic, (5) toxic.

Anaesthetic vomiting is fast disappearing. Certain remedies may be tried, such as peroxide of hydrogen, one drachm in saline, drachms 6, or adrenalin minims 30 in aqua oz. 1, or milk of magnesia or bismuth. *In giving any of these, it is important that the stomach be empty.* If the patient is vomiting clear water, the likelihood is that such emesis empties the organ, but if bilious material is vomited, nothing but gastric lavage will determine whether or not the stomach is empty.

The vomiting of gastric dilatation occurs most frequently after—(1) Cholecystectomy, (2) Removal of large ovarian cysts, (3) Abdominal tumors, (4) Splenectomy; it is characterized by the repeated vomiting of small quantities of foul smelling olive green material. There is only one thing to do, and that is repeated gastric lavage, either with an ordinary stomach tube or duodenal tube and the right side position. Obstructive vomiting is much the same in character as that of dilatation, only of later onset. The neurotic type occurs in people overwise about anaesthetics, such as nurses, doctors, and those who have been anaesthetized before. As a rule the sight of a stomach tube, and 100 grs. of sodium bromide per rectum speedily effect a cure. *Any vomiting of the anaesthetic type which persists for over twenty-four hours is either of neurotic or of toxic origin.*

The toxic vomiting is indeed a serious affair. It occurs in patients with acidosis with acetonuria, in patients with thyrotoxicocis, and in cases of prostatic hypertrophy with a high N.P.N. in the blood. Always examine the urine for acetone. If present, give plenty of glucose 10% and soda 5% per rectum by drip, or glucose 5% interstitially, or glucose 10% intravenously. In any case get fluid into the tissues. The vomiting of thyrotoxicosis, after packing the patient in ice, is best relieved by diluted hydrochloric acid in 5-10 minim doses by mouth, and bromide per rectum. This also relieves the nausea after deep Coolidge X-ray therapy.

This concludes in a brief outline the essentials in an ordinary case. You will see that we aim at *rest* and *comfort* and *abundance of fluids.* However, there are complications in some cases. In an analysis of some 400 cases in the early part of 1921, I find the following complications with their percentage occurrence:—Acute dilatation of the stomach, 2 per cent; Pneumonia, 10 per cent; Cystitis, 3 per cent; Phlebitis, 1.1 per cent; Pylorospasm, 1.5 per cent.

The occurrence of post-operative pneumonia is influenced by several factors. It occurs in about eight per cent. of abdominal cases, six per cent. in above the umbilicus and two per cent. below, and very frequently in perforated gastric and duodenal ulcers. It occurs in the base of the right lung in ninety per cent. of the cases, and if recognized in the first twenty-four hours, can be aborted by appropriate treatment in eighty per cent. of cases. Apparently the anaesthetic has very little to do with its occurrence; neither has the mode of its administration. The theory that it is due to multiple emboli seems the rational one, but several factors favor its development. Atmospheric conditions seem to be the predominant factor. In dull, damp weather, pneumonia is very common, while on clear, bright days it is very rare. The frequency in the right lung as compared with the left is evidently due to the splinting of the right side of the diaphragm. I can recall but one case following breast amputation. How do we recognize it? By suppressed breath sounds and a few crackling rales. Dullness may or may not be evident. It is usually present. This constitutes pneumonia in its early stage.

In our treatment we may be regarded as old-fashioned, but we are not ashamed of the allegation. We apply mustard and linseed poultices, continuously or intermittently, but sufficient to produce and maintain counter-irritation. By mouth we give quinine grs. 3 to 5, ergotin grs. 2 every four hours until the temperature is normal. If this fails, which it seldom does, to abort a pneumonia recognized at its inception, and consolidation proceeds, the pneumonia follows the usual course of any broncho-pneumonia.

Phlebitis is an annoying disturbance to a convalescent patient. It is of course most common after pelvic surgery, and has a tendency to appear in epidemics. Its occurrence means a month or six weeks delay in allowing the patient up out of bed. The treatment, in addition to a Thomas splint which swings free above the mattress, is to lay along the course of the

femoral vein hot lead and opium compresses. This removes the tenderness and pain more speedily than any other local application. The patient's stay in bed should be ten days after the temperature is normal in the evening.

Cystitis does occur, no matter how carefully catheterization is carried out. As a preventive measure it is a good plan to leave two or three drachms of 5% argyrol solution in the bladder after catheterization. Do not use the argyrol stronger than 5%. If it is necessary to catheterize a patient for some days, the oral administration of urotropine is worthy of trial.

I regret that we have no specific for hiccoughs. At times they are easily stopped, at others nothing at our command seems to have the slightest influence. Gastric lavage is one of the first measures to adopt. Various remedies may be used if the hiccoughs continue after the stomach is empty, e.g. aromatic spirits of ammonia, chlorodyne in milk of magnesia or bismuth, dilute hydro-chloric acid, sodium-benzyl-benzoate, iced champagne, or buttermilk. The multiplicity of remedies indicates their uncertainty of action.

Pylorospasm is a distressing ailment. The patients suffering from it are as a rule complaining of epigastric pain of varying degree of severity and continually endeavoring to belch gas. It is always wise to advise a patient against the usually useless procedure of belching. These patients are as a rule nervous, and are air swallowers. Atropine gr. 1-100 per hypo. repeated in two hours and sodium bromide gr. 100 per rectum usually bring speedy relief. If the pain is severe, a moderate dose of morphia may be given with the atropine.

In conclusion I would like to state that many distressing complications may be avoided by simple measures; e.g. in elderly people chewing gum will prevent a painful parotitis. Always allow the patient to take the most comfortable position in bed. Careful attention to a host of minor details always leads to a satisfied patient, and a satisfied patient is a real asset to any surgeon. If the attendant is master of the situation, by his personality and knowledge of post-operative management, he will have gone far towards shelving a host of his worries.

LOCAL ANAESTHESIA AS APPLIED TO OPERATIONS ON THE RECTUM AND ANUS*

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PERHAPS one of the greatest causes of bodily discomfort among our people, in all walks of life, is some one or other of the minor surgical affections of the rectum and anus. In the great majority of cases the symptoms are periodic, seldom causing the patient to take to his bed, and this fact, together with the fear of a general anaesthetic, usually causes the patient to resign himself to a life of torment unless the symptoms become sufficiently violent to drive him into seeking relief. Haemorrhoids, fissure of the anus, fistulo in ano and benign neoplasms represent the most common of such conditions and all may be handled under local anaesthesia with the use of proper technique.

In no other region of the body are we called upon to use such faultless technique because of the abundant nerve supply and it might be well just at this point to briefly point out the arrangement of the sensory nerve fibres involved. The nerves of the interior of the rectum are simply part of the sympathetic system supplying the remainder of the intestinal tube. That the ordinary nerves of sensation are absent is well demonstrated by the absence of pain in the early stages of carcinoma of the ampulla. The anal canal, on the other hand, is profusely supplied with sensory nerves and tactile corpuscles

*Read before Lambton County Medical Association.

are numerous. The nerve supply of the region about the anus as well as that of the anal canal comes from three different sources and this point is worthy of careful consideration when working with local anaesthesia. The pudic nerve, by its perineal and inferior haemorrhoidal branches is the chief supply but the ano-coccygeal nerves from the pudendal and coccygeal plexuses as well as the perineal branches from the posterior cutaneous of thigh, a branch of the lumbar plexus, contribute quite freely to the bountiful supply of sensory nerves in this region.

You will thus see that we have a perfect network of sensory nerve filaments surrounding the anal canal and unless we succeed in blocking sensation from every quarter we are liable to have pain at some stage of the operation. Imperfect anaesthesia is most embarrassing to the surgeon, to say nothing of the patient's feelings and we should always strive to have the entire procedure absolutely painless. That such a state of affairs is possible in this region has been questioned by many workers with local anaesthesia. With the elimination of the occasional patient who is unsuitable for any local procedure, the use of Braun's method, which I will endeavor to describe, has always been highly satisfactory in my hands. We have already shown, by the arrangement of the sensory nerves, why bilateral blocking of the trunk of the pudic nerve will not completely anaesthetize the anal canal. Neither will bilateral injection of the ischio-rectal space, although this procedure is more far reaching than simple blocking of the pudic nerves because the perineal branches of the posterior cutaneous of thigh are included in the latter method.

There is a large measure of psychology in every operation under local anaesthesia. Well adapted instruments must be at hand, including fine-gauge, sharp needles and good, easy-working syringes. Since the patient is not being subjected to the risk of a general anaesthetic there is no reason for a demonstration of speed on the part of the surgeon. Quiet, careful, sharp dissection, without unnecessary traction on the parts, contributes in no small degree towards a painless operation.

Technique for the anaesthetization of the anus and anal canal. A solution of ½% anocain combined with 1-100,000 epinephrin makes a very satisfactory anaesthetic for this region. Select points 1, 2, 3, and 4, each about ¾ inch. distant from the margin of the anus and forming the corners of a square. Commencing at point 1, with a 25 gauge needle make a wheal by intracutaneous injection of the skin. Pass the needle in the direction of point 2 in the subcutaneous tissue, always keeping a flow of solution distending the tissues ahead of the needle. Before withdrawing the needle, make another wheal at point 2, by injecting into the skin from within outwards. This assures a painless entry of the needle at point 2 for the anaesthetization of the line from 2 to 3. A similar wheal is made at three, while the injection to point 4 may be carried out from the original injection at point 1. Thus the only inconvenience to the patient has been the initial prick and this is reduced to a minimum by the method described. The next step is the deep injection, using a 2½ inch needle of 23 gauge and commenced by inserting the left fore-finger in the rectum until the tip is just beyond the internal sphincter. In many irritative conditions of the anus the introduction of the finger is quite painful. This may be alleviated by placing a pledget of cotton soaked in 10% cocaine solution just within the folds of the external sphincter and allowing the same to remain in position while the superficial injection is being carried out. Four punctures are made in the now fully anaesthetised skin, at points 1, 2, 3 and 4 aiming at the tip of the finger which has already been introduced beyond the internal sphincter. Solution is expelled ahead of the needle as before, until the point is felt immediately next to the finger in the bowel and separated from it only by the mucous membrane. About 10 C.C. of solution is usually sufficient for each one of these deep injections. A wait of five minutes should now be the rule in order to give the anaesthetic an opportunity to do its work.

The above technique is ideal for haemorrhoidectomy and as we have already intimated that a correct operative technique is necessary for a painless operation, let us consider a few points in this connection. I have long since reached the conclusion that the wide dilatation of the external sphincter which is generally practiced as the first step in this operation, is entirely unnecessary and I believe that such a procedure should be preserved for one's enemies. The post-operative distress with which we are all only too familiar is due almost entirely to this violent tearing of the anal outlet. A very slight

spreading of the external sphincter is often necessary but it is frequently quite possible to roll out the anal mucous membrane by means of four Allis clamps placed at the four points of the compass and so expose the pile bearing area without any dilatation. Any type of radical operation may be done by this method of anaesthesia but it is quite easy to cause the patient pain if we insist upon placing two brawny thumbs within the anus and widely separating the same. My regular procedure consists of the regular ligature operation, being careful to damage the mucous membrane of the anal canal as little as possible. The only dressing used is a cone shaped plug of gauze, well vaselined and held firmly against the anus by a tight fitting T bandage. The placing of a tube in the anal canal is quite unnecessary and causes the patient a great deal of discomfort. These operations are usually done in the office and the patient returned to his home in a taxi where he remains for a few days without a bowel movement spending most of his time in the reclining position. They rarely have any post-operative distress and it often requires argument to keep them off their feet until the bowels are moved.

Radical operation for fistulo in ano and fissure do not require a complete blocking as above described. The anaesthetization of a wedge shaped sector of the anal region, including the diseased area, is quite sufficient but the deep injection must be carried above the internal sphincter at the sharp point of the "wedge." This method is also effectual for the excision of benign neoplasms.

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PLASTIC SURGERY OF THE HEAD AND NECK

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IN private practice, the cases needing plastic surgery are:—*burns*, where considerable contraction has resulted; *deformities* due to motor accidents, or loss of cartilaginous or bony support of the nose due to lues or tuberculosis; *loss of function* of the seventh nerve (facial paralysis); and *congenital* deformities such as hare-lip and cleft palate.

There are two types of deformity following burns, one from loss of tissue, and the other where dense fibrous bands have formed in the process of healing. In the *former*, frequently the result of electrical burn, an entire lip may be lost, or most of the nose, and these deformities are markedly lessened by plastic surgery. If a lower lip has been lost, a new lip with vermillion border may be supplied by incising completely through the cheek on the same side, including the mucous membrane. This flap is then brought into its new position and sutured, observing the same care in suturing the mucous membrane as the skin. In reconstructing the *nose*, first a lining is obtained for the reconstructed nose from the adjacent tissue by turning the skin surface under, and a forehead flap obtained to cover this raw area. It may be necessary to supply cartilage subsequently, and this may be obtained from the costal cartilage, preferably from the seventh rib.

In treating the ordinary contractions following severe burns of the face, as a rule the eyelids are markedly everted and fixed. To overcome this ectropion, incisions are made parallel to the Tarsal cartilages of the upper and lower eyelids from the inner canthus to the outer, and leaving if possible a slight bridge of tissue between the two incisions; at any rate, seldom should an incision be made across the inner canthus. The undermining of both of these incisions is as complete as possible and then Thiersch or Wolff grafts are used to cover the raw surfaces. Some men sew the eyelids together at this time and leave them for six months, but in my opinion this is seldom necessary. To avoid

this, the graft, if full thickness is used, may be sutured into position, and if thin or Thiersch, may be wrapped around some dental compound and buried in each incision, to be removed in six to eight days. Where a contraction has occurred in the socket of an enucleated eye, this dental compound may be used as above described inside the socket to reproduce the Fornix. Speaking of enucleated eyes—and this has nothing to do with burns—the sunken appearance may be overcome by making an incision into the capsule and implanting cartilage. This greatly assists in giving free movement to the artificial eye. It is frequently necessary to reconstruct a cheek or part of the neck, due to fibrous bands holding the chin against the chest, and this is overcome by using skin from the chest on a pedicle.

Frequently cases present where the entire septum of the nose has been lost, and after treatment the Wassermann may be negative. This saddle-backed deformity can be improved with cartilage taken from the seventh rib and implanted in the nose, forming a new bridge and columeller support. This is a very satisfactory operation to the patient, as the bridge can be reformed without any noticeable scars. Two incisions may be used, one in the columella with free undermining, using blunt-pointed tenotomy knives, or across the glabella between the eyebrows.

In treating the congenital deformities, especially the hare-lip and cleft palate, the greatest of care must be exercised. I believe that surgeons should realize more fully the responsibility of treating these cases. There is one golden opportunity when thinking of results, and that is at the first operation. Many conditions must be considered,—health of patient, age, time of speaking, and whether or not bone-approximation is to be attempted. I believe that if the separation is wide in the single hare-lip and cleft palate case, pressure to close this gap in the anterior region should be used in the form of lead plates and wires,—but this must be attempted before the fourth month. The lip may be closed any time after the gap has been closed. I know that the pressure from the lip will sometimes approximate the fissure, but no bony union is obtained. The time to do the palate, I believe, is about the fourteenth month, provided the general condition is good, or before the child tries to speak. In this operation for closing the cleft in the palate, lateral incisions should seldom be necessary as properly placed lead plates and tension sutures will allow for the closure. I am well aware that this is tedious and tiresome to accomplish, but in the field of surgery one must be a slave to detail. The after-treatment is very important, namely, as little food as possible for the first few days and the stitches kept dry or as free from moisture as practicable.

Recently I have attempted to overcome the effect of facial paralysis on the eye by the use of fascia from the hip, suggested by Gallie of Toronto. This fascia is introduced below the level of the inner canthus, carried subdermically across the upper lid to the external canthus and slightly below it, and attached, if possible, to the periosteum. This converts the condition into a ptosis, if sufficient tension is produced by attaching this strip of fascia to the periosteum in the region of the external canthus. At first the patient cannot raise the lid, but with practice he can elevate it high enough for visional purposes. I have done only two, one eight months ago, and to date they show improvement.

There is another type of deformity that one sees following severe injury to the face, and that is large loss of bone from the mandible, leaving the chin and lower part of the face in a bad position. We have found that a free autogenous bone-graft from the crest of the ilium is of great service, as the bone consolidates quickly and any size graft may be obtained.

HELIOTHERAPY IN SURGICAL TUBERCULOSIS*

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IT is probable that a belief in the beneficial action of sunshine has existed in the minds of men for centuries. Nevertheless it is only within comparatively recent years that sunshine has been used consistently as a therapeutic agent. On this continent for various reasons we have been somewhat slow to adopt its use, so that heliotherapy is here comparatively little known. For this reason I have thought it of interest to report the results of its use in a group of cases of surgical tuberculosis, the more so since these results appear to be a decided improvement over those obtained by previous methods of treating such cases. For the sake of clarity, I must preface my report with a brief outline of the physics of light, the physiological action of light, and the present status of heliotherapy.

Physics of Light. Light from any source consists of etheric vibrations of various wave lengths. It is customary to measure these wave lengths in millimicrons; one millimicron being one one-millionth of a millimetre. The nature and action of any particular kind of light are dependant upon its wave length. Rays of wave lengths between 780 and 380 millimicrons penetrate the eye, stimulate the retina, and are perceived as visible light. The effect upon the retina of the longest of these wave lengths is to produce the light-sensation we designate as red. The effect of the shortest visible wave lengths is to produce the light sensation of violet. Between these two extremes, rays of intermediate wave lengths produce the familiar gradation of colour seen in the spectrum. Beyond the longest visible red rays are others of still longer wave lengths which produce no effect upon the retina, but which we perceive as heat. Hence they are termed heat rays, or infra-red rays. Beyond the shortest visible violet rays are others of still shorter wave lengths, which cannot be perceived by the retina, but which are capable of producing very definite reactions, the most familiar of which is the photo-chemical reaction utilized in photography. These are ultra-violet rays. Light from various sources consists of mixtures of rays of various wave lengths, the mixtures being constant for each particular source of light. Sunshine (Fig. 1) contains rays of wave lengths varying from about 1300 to 290 millimicrons (the infra-red limit varies due to absorption by water vapour in the atmosphere). Sunshine contains, therefore, in addition to visible light rays, considerable quantities of heat rays and ultra-violet rays. Most of the physiological effects of light are produced by the ultra-violet rays it contains.

Physiological Action of Light. The physiological action of light may be summarized briefly, since our knowledge on this subject is fragmentary. The most important of its actions are those upon the skin, upon metabolism, and upon bacteria.

The action of light upon the skin is more accurately known than any of its other physiological effects. Here, as elsewhere, the important effects are produced by ultra-violet rays. Three phenomena occur, viz.: erythema, pigmentation, and vaso-dilatation. The erythema produced by light is of the nature of an inflammatory reaction. It makes its first appearance several hours after exposure, and may reach any degree up to extreme vesication, depending upon the length of exposure, the intensity of the light, its richness in ultra-violet rays, and the amount of pigmentation present in the skin of the patient. Under the name of sunburn, this erythema is, of course, familiar to us all. Under certain circumstances a similar inflammatory reaction may be produced in the conjunctiva (e.g. the production of snow blindness by reflection of sunshine from the snow.) If the skin is repeatedly exposed to light for periods of insufficient length to cause marked erythema, it rapidly develops an increased amount of pigment. This appears to be a protective mechanism for the defence of the organism against ultra-violet rays. The rate at which the increased pigmentation is acquired, and the intensity it reaches, vary greatly with indi-

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viduals. Blondes pigment poorly; brunettes rapidly and to a marked degree. There is some evidence to make one believe that a certain parallelism exists between the degree of pigmentation and the benefit to be derived from heliotherapy. Rollier is strongly of the opinion that only those patients who pigment well show marked improvement under sunshine treatment. In addition to erythema and pigmentation, light produces a dilatation of the capillaries of the skin which persists for a long time. It is most easily observed in patients who, after exposure to sunshine for considerable lengths of time, are withdrawn from such treatment (e.g. during the winter). In such patients the pigment gradually fades. The skin is then seen to be uniformly pink, due to capillary congestion. This ruddiness of the skin persists for long periods of time.

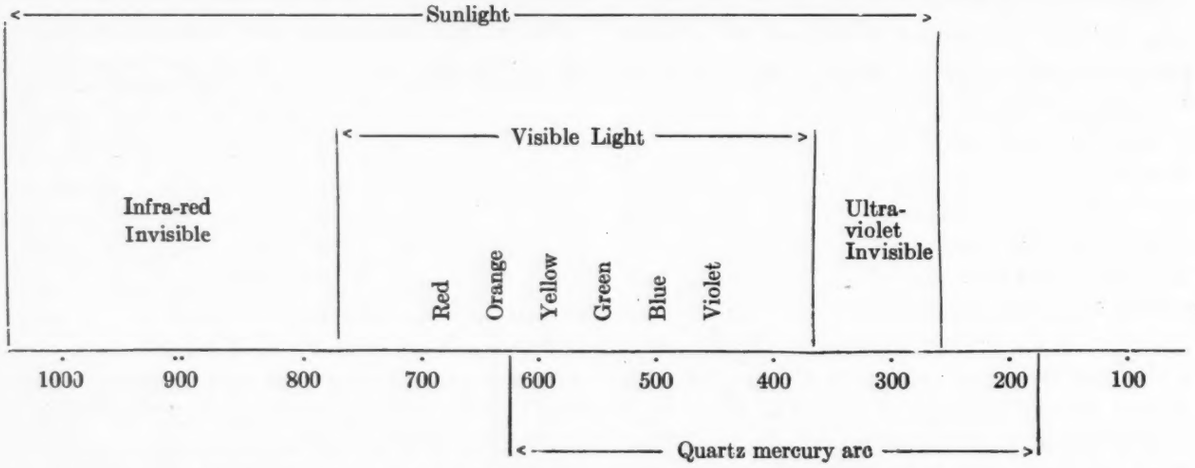

FIG. I.—Graphic representation of the visible and invisible light rays, their position in the spectrum, and the range covered by sunlight and by light from a quartz mercury arc. Figures represent wave-lengths in millimicrons, one millimicron = 1/1,000,000 millimetre,

By some means with which we are not yet familiar, light is able to produce changes in metabolism. In treating patients with sunshine, one cannot fail to notice the marked improvement that takes place in their general health; their appetite improves, they look ruddy and healthy, and they have a sense of mental well-being which is very striking, though it is difficult to define. Recently one phase of this metabolic action has been investigated by workers in the problem of rickets. Hess has shown that under the influence of light alone (either from the sun or from a quartz mercury arc) the phosphate content of the serum of rachitic infants rises rapidly from the low level characteristic of this disease, to the normal level, or even higher. Coincident with this rise in the phosphate content of the serum, the bony lesions are cured by the deposition of new bone. This can be clearly seen by a series of radiographs. That these changes are effected through metabolic processes, and not by the action of the light directly upon the diseased epiphyseal lines, has been demonstrated by the cure of wide-spread rickets by exposure of only a portion of the body to the light. Hess records such a cure produced by exposing only one arm to sunshine. It seems probable that this metabolic action of light is most important from the therapeutic standpoint, a point which will be discussed more fully later.

Light is markedly bactericidal. It has been repeatedly shown that its efficiency as a lethal agent on bacteria is proportionate to its content in ultra-violet rays. For this reason artificial sources of light rich in ultra-violet rays are more efficient sterilizing agents than is sunshine.

In addition to the above physiological actions, light produces a well-marked lymphocytosis. The mechanism and significance of this action is unknown. There is also an obscure and interesting phenomenon known as photodynamic sensitization, the discussion of which does not appear to belong to this paper.

Heliotherapy. The use of light as a therapeutic agent dates from 1896, when Finsen established his Light Institute in Copenhagen for the treatment of lupus. Since that time light in various forms has been used for a variety of pathological conditions. In 1903 Rollier opened an institution at Leysin for the treatment of surgical tuberculosis by means of sunshine. Rol-

ner's reports have done much to popularize sun treatment, especially in Europe, and from such sources a large amount of empirical information has been accumulated which forms the basis of our present knowledge of this type of treatment.

Naturally enough, sunshine was the first kind of light used therapeutically, and is still, on the whole, the most satisfactory form. A belief that the beneficial action of sunshine is due to its content of ultra-violet rays led to the use of artificial sources of light rich in ultra-violet rays. Finsen's lamp was a carbon arc, the rays of which were concentrated by lenses, and cooled by the interposition of a stream of water. Practically all the substitutes or attempted improvements upon sunshine are electric arcs of some type. The ultra-violet ray content varies with the kind of electrode used to form the arc. A carbon arc emits light containing rays of wave lengths down to 300 millimicrons; an iron arc down to 240 millimicrons. Both these forms of light, for best effects, must be used naked (i.e. without the interposition of glass, since glass filters out the ultra-violet rays.) Probably the source of artificial light best adapted for this purpose is a mercury arc enclosed in a quartz cell, because of the fact that quartz is permeable to rays of wave lengths down to 150 millimicrons. There are some objections to such artificial sources of light, the gravest of which is their primary cost. This limits the number of lamps available, and this in turn limits the amount of exposure which can be given to each patient. In addition they do not exactly reproduce the effect of sunshine. The therapeutic action of sunlight cannot be explained by ascribing it simply to the ultra-violet rays it contains.

The empirical knowledge accumulated since Finsen first commenced using sunshine for the cure of lupus, indicates that light is of value in the treatment of certain forms of tuberculosis, in certain skin conditions, in rickets, and perhaps in certain forms of wounds.

Tuberculosis of the skin responds readily to treatment by light. The demonstration of this by Finsen marked the beginning of heliotherapy. Its widest field of usefulness, however, is in the treatment of tuberculosis of bones and joints. It has been the observation of nearly every user, that in this particular form of tuberculosis, light has a striking and almost specific effect. It is stated to be of value in certain forms of soft tissue tuberculosis, notably tuberculous peritonitis and renal tuberculosis. It is contra-indicated in pulmonary tuberculosis, because of the frequency with which it produces haemoptysis. This is due probably, to the congestion of the lung which is known to occur after exposure to light.

Superficial pustular skin infections, such as acne, are cured by exposure to sunshine. Rollier records an interesting observation in connection with the action of light upon the skin. An epidemic of chicken-pox occurred at his sanitarium at Leysin. He observed that those patients who were completely exposed to sunshine had no rash. Those patients whose bodies were partially covered by plaster jackets or spicas developed a rash only on the protected areas. The rash stopped at the line marking the limit of the tan. Rollier regards this as an evidence that the pigment itself is an agent capable of protection against disease.

The most interesting advance in the use of heliotherapy has been its application to the treatment of rickets. The seasonal incidence of rickets has long been noted. It is a disease of winter. One of the theories of its origin, now overshadowed by the more striking vitamine-deficiency theory, is that it is due to confinement and bad ventilation. Whatever the cause of this disease, it has been abundantly proven that a cure can be obtained with certainty by exposure of the patient to any source of light containing ultra-violet rays. Hess records several cures in which exposure to sunshine was the only treatment. Tisdall has produced similar cures by exposure to light from a quartz mercury arc. Experimental evidence confirms these clinical cures. Rats fed on a diet which invariably produces rickets in controls, can be protected against the onset of this disease by exposure to sunshine or ultra-violet light. Not only is a cure of the bony lesions of rickets effected by means of light, but the disturbed metabolism is returned to normal. During active rickets the phosphate content of the serum is markedly decreased. Under treatment by sunshine it rapidly rises to normal, or to an even higher level.

Clinical Cases. Four years ago there was established at Christie Street Hospital, a small roof ward for the treatment of certain cases of Pott's disease. The results obtained were consid-

ered sufficiently encouraging to warrant expansion of the ward and the institution of heliotherapy as a routine treatment for surgical tuberculosis. The results obtained from this treatment are the basis of my paper.

Up to the end of 1922 there were treated in this ward sixty-one cases of tuberculosis of various parts of the body other than the lungs. I have divided these cases into two groups depending upon whether the focus was in bones or soft tissues.

A.—Bone tuberculosis—49 cases.
- 36 cases of Pott's disease
- 6 cases of hip joint disease
- 2 cases of tuberculous knee
- 3 cases of sacroiliac disease
- 1 case of tuberculous shoulder
- 1 case of tuberculous sternum.

B.—Soft tissue tuberculosis—12 cases.
- 6 cases of tuberculous peritonitis
- 1 case of tuberculous adenitis
- 1 case of tuberculous kidney and cystitis
- 1 case of tuberculous appendicitis
- 1 case of tuberculosis of skin
- 1 case of tuberculosis of thigh
- 1 case of tuberculous empyema.

Treatment. These patients were all treated in a similar manner. The usual orthopaedic principle of rest was instituted by relieving the tuberculous focus of movement and weight bearing. Patients with Pott's disease were placed in bed, on suitable Bradford frames. Cases of cervical and high thoracic Pott's disease were given additional fixation by means of a halter and weight extension applied to the head. Most of the cases of high thoracic and low lumbar Pott's disease had a spinal bone-graft operation performed during the period of recumbency, on account of the difficulty of fixing the spine in these locations by any type of brace. In the cases of hip joint disease and tuberculous knee, fixation was provided by means of plaster casts, combined with recumbency in bed. The cases of soft tissue tuberculosis were also kept in bed. All the patients were given a diet rich in milk and eggs, and were encouraged to take as much food as possible.

In addition to these usual orthopaedic measures, each patient was exposed to sunshine. Exposure was commenced gradually. The patients were stripped of all coverings with the exception of a towel over the genitals. They were then exposed to sunshine for 20 to 30 minutes the first day. This exposure was increased each day by 15 minutes, until pigmentation was attained. Once well tanned, they were exposed to the sun all day. Both back and front of the patients were exposed, care being taken to maintain fixation of the diseased part while the patients were turned on their abdomen. During the four summers in which this ward has been open, it has been possible to commence sun treatment in May and continue it into October. During May and October there are many days in which it is too cold and stormy to permit exposure of the whole body, but in spite of this there remain about five months in which one can count on complete exposure on every sunny day. In Toronto and in an industrial and therefore smoky section of the city, the number of hours of sunshine available for exposure is surprisingly high. During the past summer the average exposure of patients who were on the ward all summer was 535 hours each.

In administering sun treatment, certain precautions add greatly to the comfort of the patients. Heat in the middle of summer is sometimes troublesome, and if excessive, may be even prostrating. This is particularly true in solaria situated on the tops of buildings, the gravel roofs of which reflect a tremendous amount of heat. It is always well to provide means of keeping the patients' heads shaded; otherwise they suffer from headache and dizziness. Smoked glasses are useful as the glare sometimes produces conjunctivitis. Abundance of cool drinks, and an electric fan to provide a breeze should a natural one fail, are essential. On the hottest days we have sometimes had to move the patients into the shade, though as a matter of fact, the patients have felt the heat much less than the staff. A few cases of minor heat stroke occurred, as evidenced by headache, restlessness and sleeplessness, but these have been relieved by a few hours in a cool shaded place. On very hot days an elevation of temperature is occasionally seen. Certain patients appear to have an idiocyncrasy which makes them respond to sun exposure by a fever. In one patient, at the Lakeside Home, heliotherapy had to be abandoned because an hour's exposure produced a pyrexia of 103.4°. This is unusual. Blonde patients must be watched carefully. They tan poorly, and cannot stand long exposure on hot days. They also lose their pigment rapidly, and after three or four cloudy or rainy days, again have to go through the process of acquiring a new coat of tan.

By June, under the above treatment, the patients were usually thoroughly tanned, and

from then until October they received four to six hours' exposure each day. Those patients whose symptoms subsided and remained quiescent were allowed up, wearing some type of appliance to keep the diseased part at rest. They commenced with thirty minutes out of bed each day, and gradually increased this allowance. A careful watch was kept for symptoms indicative of recurrent activity in the focus.

Cured	*Apparently Cured*	*Improved*	*Unimproved*	*Died*
No signs of activity Increase in weight Have been up 6 mos. to 2 years without recurrence	No signs of activity Increase in weight Are still in bed or have been up only a short time	Still show some signs of activity though much better than on admission		
23 cases including 12 multiple foci 12 sinuses 1 paraplegia	12 cases including 3 multiple foci 5 sinuses 1 paraplegia	10 cases Nine of whom are recent admissions	1 case	3 cases 1 miliary tuberculosis 2 amyloid disease

FIG. II.—Table summarizing Results in Cases of Bone Tuberculosis.

While convalescent they continued their sun treatment.

Results of Treatment. The results, as far as bone tuberculosis is concerned, have been very gratifying. The 49 cases in this group may be analyzed as follows: (A) twenty-three cases are *cured.* By cured I mean they have no evidence of active disease, and their general health is excellent. Sinuses have dried up and are now healed. Abscesses have disappeared. They have no muscle spasm or pain. They have all put on weight. The average gain in weight in this group from the outset of treatment to discharge has been fifteen pounds. They have all been up for periods varying from six months to two years. Most of them have gone to their homes, and are engaged in occupations compatible with their physical capacity. None of them have shown any signs of recurrence. This group includes thirteen patients who had tuberculous sinuses, twelve patients who had multiple foci of tuberculosis, and one patient who had paraplegia.

(B) Twelve cases are *apparently cured.* By this I mean they now show no sign of activity, no muscle spasm or pain; sinuses, if formerly present, have healed; but they have either been up for a short time only, or are still kept in bed as a precautionary measure. There has been an average increase in weight of ten pounds. They are cases of shorter duration than the first group. They include three patients who had multiple foci of tuberculosis, five patients who had sinuses, and one patient who had paraplegia.

(C) Ten patients are *much improved,* though they still present signs of active disease. Three have sinuses which are steadily diminishing, five have still some muscle spasm, one has a small abscess, and the condition of one is obscure. In addition to thoracic Pott's disease he has chronic pulmonary tuberculosis and marked hypertrophic pulmonary osteoarthropathy. Nine patients in this group are the most recent arrivals in the ward.

(D) One patient is *not improving.* He has tuberculosis of the hip joint with multiple sinuses which are secondarily-infected. His temperature is septic and there appears to be a danger of amyloid disease.

(E) Three patients have *died.* All three were in a hopeless condition on admission. One had miliary tuberculosis and two had multiple, secondarily-infected tuberculous sinuses with amyloid disease. If we exclude these three cases who were hopeless on admission, the results in forty-six patients may be summarized as follows: cured or apparently cured thirty-five cases; improved ten cases; unimproved one case.

The results in cases of soft tissue tuberculosis do not appear so gratifying, though the number of cases is too small to draw certain conclusions.

Six cases are *cured.* One case is *apparently cured.* Two cases are *improved.* Two cases are *unimproved* (one of extensive renal and vesical

tuberculosis and one of advanced peritoneal tuberculosis). One case has *died,* (advanced tuberculous peritonitis who was moribund on admission.)

Consideration of results. The results have been much better in cases of bone tuberculosis than in cases of soft tissue tuberculosis. It is of course difficult to know just how much of this result to attribute to sunshine. In the present state of our knowledge of the action of sunshine, any conclusions we draw as to the results of heliotherapy must of necessity be empirical. Approach to accuracy can only be obtained by comparison of large series of cases treated by sunshine with similar series treated without sunshine. My contact with these cases leads me to feel that bone tuberculosis is cured more certainly and more rapidly if heliotherapy is added to the usual methods of treatment. The beneficial action of sunshine was well illustrated by a small group of cases who occupied the ward during the first summer it was open. They almost all had multpile foci of tuberculosis, with discharging sinuses. During the summer they improved, the sinuses closed, and they put on weight. In October it was necessary to move them off the roof to an inside ward. Their treatment there was the same in every particular except that they had no sun exposure. None of them continued to improve during the winter. About half of them held their own, and in the spring were in the same condition as when they left the roof the preceding fall. The remaining half suffered relapses. Their sinuses broke down; they lost weight and their temperature became elevated. This continued until it was possible to put them in the sunshine again. Almost at once they began to improve, and in two months' time were very greatly better. This effect of sunshine upon surgical tuberculosis appears to be produced through the agency of the patient's metabolism. It is impossible to believe that a sufficient number of the sun's rays can penetrate into the depths of a focus of Pott's disease and exert a bactericidal action there, or that exposing the mouth of a sinus in the thigh due to a psoas abscess, can have any effect on the carious process in the thoracic vertebrae. The action of sunshine appears to enhance the resistive powers of the patient, and enable him, by this means, to overcome the focus of disease; hence the rationale of exposing the whole of the patient's body, front and back, in order to permit the greatest absorption of sun's rays. The favorable action of sunshine in cases of bone tuberculosis as compared with soft tissue tuberculosis, may perhaps be explained by the recent work in the problem of rickets. As has been mentioned before, it has been demonstrated that sunshine is capable of causing the deposition of new bone in rachitic foci. Examination of the blood of such patients during treatment by sunshine shows increase in the blood phosphorus, presumably in order to supply the increased amount of bone salts necessary for the new bone formation. Moreover it has long been known that rickets is a disease of winter. The cure of bone tuberculosis is affected, or at least accompanied, by the deposition of new bone in the tuberculous focus. It is customary to judge the progress of cure by following the amount of new bone laid down, as shown in the x-ray. If the

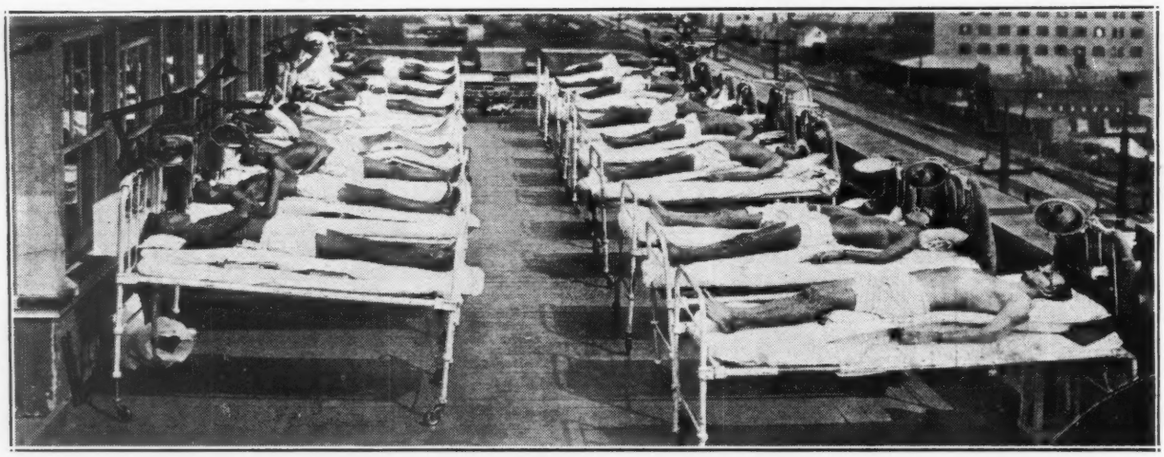

FIG. III.—Patients receiving Heliotherapy.

bone-forming power of sunshine suggested by these experiments is confirmed, it may well be that herein lies the reason for its greater efficacy in bone tuberculosis as compared with soft tissue tuberculosis.

An attempt has been made to compensate for the absence of sunshine during the winter by using quartz mercury lights. It is somewhat difficult to form an opinion as to their merit. The lamps are expensive, and for this reason the number one can have is limited. This in turn limits the amount of exposure possible to give each patient. During the past winter my patients received 30 minutes' exposure to quartz mercury light each day, as compared with four to six hours' sunshine during the summer. Exposure to this light produces pigmentation of the skin fairly rapidly, but it is of a lesser degree than that produced by sunshine. Its effect upon tuberculous foci is not so striking as that of sunshine. In fact I am doubtful whether it plays any part in hastening the cure of the patient, though this point is still *sub judice.*

Conclusions. 1. Sunshine appears to be a valuable adjunct in the treatment of bone tuberculosis, in that a cure is attained by its aid more quickly and more certainly.

2. In cases of soft tissue tuberculosis it does not appear to have the same beneficial effect.

3. The value of quartz mercury light as a substitute for sunshine is, as yet, not certainly known.

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PUBLIC HEALTH ORGANIZATION*

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THE last ten of fifteen years has witnessed a radical change with respect to two important phases of the public health problem at least. In the first place the old obsession, that the sources of man's infections were traceable to his environment, has been displaced by present day beliefs resulting from fuller and more accurate knowledge gained by a combination of laboratory and epidemiological studies. The modern theory of infection finds the source of disease in the individual himself—the excretions and emanations of his body, and the transmission of the virus to his fellow-beings to be by contact, direct or indirect, the well nigh universal route.

Secondly, the perspective of the sanitarian, has undergone a remarkable change and his horizon has tremendously widened. Papers at a conference representative of every health department in Ontario on topics such as "Prenatal Care," "Squint," "More Efficient Care of Mothers," "How to produce a clean and safe milk supply," attest the character and significance of the revolution in our ideas as to what may reasonably be considered within the province of the health official and calculated to absorb his energies. In addition to the control of communicable diseases, supervision of water supplies, sewage, housing, and elimination of nuisances, we do not hesitate to include in the category of public health activities such subjects as infant welfare, school hygiene, public health education, industrial hygiene, dental hygiene and personal hygiene. These and other matters of perhaps lesser but still vital importance are to-day regarded without suspicion of protest as coming legitimately within the purview of the regularly constituted health authorities.

My object in this paper is to suggest in what directions future efforts of our health departments might be profitably exerted, while attempting also to outline very briefly changes in

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machinery and construction necessary to maintain our position as leaders and directors in the new era, and calculated to secure the best and most permanent results. The present system of administration reflects quite characteristically the rapidity of the evolutionary changes in our ideas with respect to the causation of disease and the method of prevention, and in my opinion leaves much to be desired. How best can it be improved? I believe by an extension and elaboration of our present system of health districts. No one in close touch with matters pertaining to the public health in the Province of Ontario during recent years, will question for a moment that the revision of the public health act of 1912, the amendments thereto, and particularly the division of the Province into approximately equivalent units of population for purposes of greater efficiency of administration, has been productive of encouraging results. Among the changes for the better, it is safe to say that the more direct interest of the district health officer in the work of the local boards has had a stimulating influence on the work of the local officers, and has led to the awakening of a keener interest in health matters in many communities throughout the Province. It has become the exception rather than the rule for outbreaks of infectious disease to assume dangerous proportions before arousing the attention of the local authorities, a fact which, in itself, tends greatly to increase the confidence of the general public in the purpose of a health officer and to create respect for his official position.

Several of the States in the American Union have evolved a plan similar in idea to that devised in Ontario, for the appointment of district officers and their duties are similar in character. The Ohio law of 1919, however, provides that each county and each city of more than 25,000 population must employ for full time service, a health officer, a public health nurse and a clerk whose salaries should be paid from local funds.

In my opinion the general adoption of some such plan would be a step in the right direction and productive of benefits hitherto unrealized in Canada in the field of preventive medicine. I would go further and assert with confidence that some such innovation is an essential prerequisite to any marked progress in securing the advantages in community health and happiness that our scientific knowledge warrants us in aspiring to immediately, and is also unquestionably demanded if our responsibility as health officials is to receive the recognition it deserves.

It is true that in our larger centres of population there has been remarkable progress during recent years in the adoption of scientific methods, particularly in the practical application of laboratory findings to the routine departmental work. In many of these centres we have full time health officers, full time bacteriologists, qualified food inspectors, and a corps of public health nurses: each division working in harmony with the others toward the prevention of preventable disease. Even with such impressive equipment and elaborate machinery supported by annual appropriations by no means of trifling or insignificant proportions, can it be truthfully asserted that we are accomplishing more than merely lopping off the branches, instead of striking at the root of the giant ygdrasil under the protecting shade of which the forces of disease and death threaten continually the welfare and happiness of our people? The exanthematous diseases still kill their thousands, the great white plague its tens of thousands, annually.

Time will not permit even a feeble attempt at an enumeration of the many fields of public health endeavor in which, by reason of insufficient funds and imperfect organization the urban M.O.H. is not permitted to engage, save in a desultory fashion. The adequate housing of our artisan population is in its infancy. Our child welfare work is spasmodic and fragmentary, our school inspection imperfect, while industrial hygiene is as yet not much beyond the stage of experimental research. We have scarcely done more than touch the fringe of the venereal disease problem. In the domain of mental hygiene, while the problems of delinquency, incorrigibility and criminality are receiving some attention, the question of how to increase the stock of the thrifty and capable and to shift from their shoulders the burden of the unenterprising rich and unenterprising poor is still in the novitiate stage.

If this is the state of affairs in our large cities, what shall be said of hygienic advancement in our smaller cities, towns and rural districts? In some of these, particularly in the rural districts, the last decade has witnessed a marked

improvement in the sanitation of rural homes, but in many sections signs of progress are still lacking. Respiratory infections arising from neglect of personal hygiene and circulatory disturbances due to exposure and overwork are very prevalent. Small outbreaks of typhoid fever are still a frequent occurrence among our suburban populations, and in our towns and smaller cities our water supply requires the constant supervision of the central authorities to ensure its purity. It is stated by those in close touch with the tuberculosis problem, that this disease is surprisingly prevalent in some of our farming communities. It is only in the last few years, through the bureau of child hygiene of the provincial board of health, that active interest in the care of babies and the promotion of child welfare has been introduced in our towns and smaller cities. No cities of under 20,000 people employ a full time health officer. It is said they can not afford to do so, from lack of funds. In populations of less than 15,000 persons, not to speak of towns, villages and rural municipalities, full time health officers, bacteriologists, milk and dairy inspectors are out of the question, because the expense of maintaining such a staff is prohibitive, and moreover if finances were forthcoming, the amount of work to be done would be insufficient to occupy their undivided attention, with consequent waste of funds, dissatisfaction, criticism and disparagement of public health work.

My contention is that most of our difficulties in providing an adequate service, and a service that would command more universal respect, is due to the fact that our unit of administration is too small. Given a population of from 25,000 to 50,000 persons we have first and most important to provide a full time health officer. To be successful this official must be intelligent and specially educated and trained for his work. The popular misconception that any graduate from a medical school is competent to assume the duties of health officer is responsible for many of our shortcomings in the practice of preventive medicine. The scriptural statement that no man can serve two masters is exemplified by the attempt of a physician dependent on practice for a living, to discharge satisfactorily the duties of the M.O.H.. If he carries out the duties as a side issue in his daily routine, the importance of the work is discounted in the eyes of the public; if he is faithful and conscientious he makes enemies and injures his reputation. The full time health officer should above all things, be imbued with the idea that his work is a public necessity and a solemn trust. He ought to be held responsible for the public health in a community, using the term in its broadest sense. I think the words "public health" convey a rather hazy and indefinite meaning to the man on the street, and if it were possible to rechristen our health departments as departments of preventive medicine, the prestige of our position would be greatly enhanced.

In a population such as I have mentioned there should be provided a competent health officer with his tenure of office sufficiently secured, and there should be an adequate revenue for the support of a health department organized to meet the special needs of the area it is intended to serve. A commissioner, a board of health, or a governing body of some political sort may be included but is not indispensable. An appointee of the government, answerable to the central authority, as in the case of the district officers, and relying for criticism or reward on a body capable of judging intelligently, has advantages not be be ignored. There should be a well equipped central building or office from which the direction of all the personnel should proceed. Call it a health department, health centre, community centre, or department of preventive medicine, as you please; names are immaterial. Let function be its chief importance and let this function be the prevention of disease. A small but efficient laboratory is essential and cannot be dispensed with.

The place of the voluntary agency in relation to the official health officer I shall not attempt to touch upon. The question has afforded material for very considerable discussion and is still in most communities an unsettled controversy. My personal opinion is that if it were possible to accomplish a consolidation of effort and uniformity of purpose among the voluntary associations, so that the whole problem of disease prevention could be surveyed by them in its entirety and effort not exclusively focussed on special and often narrow fields, the net gain to the cause of public health would be very considerable indeed.

That the health officer should confine himself to the exercise of his powers as a police official, I do not believe for a moment. Like the pilgrim in Bunyan's famous allegory, so long as he is burdened with the weight of this delusion he

flounders in the Slough of Despond. The more time he spends on understanding the temperament of his community, and educating them to accept compulsion, the less excuse he finds for the employment of his punitive authority. "To hear people talking about police regulations," says Dr. Hastings in his epigrammatic manner, "is like ministers talking hell fire." Neither do I believe the organization of our work in preventive medicine should proceed halfheartedly along haphazard lines. The salvage of human life transcends in importance all other considerations in the conduct of human affairs. The words of the Chief Health Officer of the province in his review of ten years progress will be a foreword for future generations. "It is the paramount duty of every government to protect the health of its citizens. Prevention of disease is by far the greatest field of modern medicine. It is not only the most economical but the most reasonable, successful and satisfactory plan of procedure in respect to diseases."

OSTEO-ARTHRITIS*

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THERE are numerous names for this chronic disease of the bones and joints, and all seem to refer to one condition, variously named by different observers, and due in its many pathological manifestations to one cause, namely, bacterial infections and their toxines. That infection is the cause of osteo-arthritis seems pretty well established in the minds of present day writers, and we hear and read little of intestinal stasis or altered metabolism as the primary cause, except in so far as they favor the spread of bacterial infection.

Many papers have appeared recently on the dangers which may arise from focal infection, and much experimental work has been done to demonstrate the association of infected tonsils, infected sinuses, and infected teeth, with osteo-arthritis and its many allied conditions—fibrositis, myositis, neuritis, neuralgia, myalgia, and peri-ostitis. Which one of these tissues is involved in the many indefinite shoulder pains, pains in the back and pains in the extremities, with negative *x*-ray findings and due to focal infection, I for one have no way of determining, and believe that in this I have many fellow sympathizers. Teeth hold first place in the list of septic foci; *x*-rays revealing septic conditions about teeth that are not shown by ordinary examination. Banjamin Rush[1] wrote the following history in 1801: "Some time in the month of October I attended Miss A. C. with a rheumatism in her hip joint, which yielded for a while to the several remedies for that disease. In the month of November it returned with great violence, accompanied with a severe tooth-ache. Suspecting that the rheumatic infection was excited by the pain in her tooth, which was decayed. I directed it to be extracted. The rheumatism immediately left her hip and she recovered in a few days. She has continued ever since, free from it. I have been made happy by discovering that I have only added to the observations of other physicians, in pointing out a connection between the extraction of decayed and diseased teeth, and a cure of general diseases." As the editor observes, except for some difference in style, this might have been written one hundred years later.

Next in importance to teeth, comes the tonsils. British writers are much more cautious than American, in their statements as to the importance of the tonsil. Jones-Llewellyn[2] and Bassett-Jones in their work *Fibrositis* only mentioned tonsillitis as pre-disposing to relapses. Jones-Llewellyn in his *Arthritis Deformans*[3], believes the etiological importance of throat infections in rheumatoid arthritis, is underestimated. Under the head of treatment, he advises that the teeth should be attended to, first, and later, in any case of rheumatoid arthritis in which recurring attacks of tonsillitis have been followed by exacerbations of the joint

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condition, it would seem justifiable to advocate excision as a prophylactic measure against future attacks. In his recent works, Dr. Llewellyn is insistent on the etiological importance of the tonsil in chronic arthritis, and devotes considerable space in "Gout" to the rôle of the tonsil in providing the source of infection for this condition. The tonsil is suggested definitely in some cases, thus: "The arthritis began after tonsillitis, and each fresh attack gives rise to an exacerbation of the joint pains." In others the tonsil only comes under suspicion because no other focus of infection can be found. That the tonsil can supply the organism that causes arthritis has been proven by animal experiments. The question as to what is a septic tonsil cannot be answered clinically or indeed bacteriologically to judge from recent careful work on tonsil crypts.

There is a tendency for the disease to come to a standstill in all cases spontaneously, and too much importance cannot be claimed for improvement following at long intervals after the removal of tonsils"[4]. Watson Williams states: "There lies in the nasal accessory sinuses, a possible source of chronic systemic infection, which merits more attention than has hitherto been accorded to this region[5]. A nasal source of infection in osteo-arthritis is liable to escape attention, and the joint affection is more prone to arise in patients whose nasal symptoms are slight, rather than in those where there is profuse nasal rhinitis. The cause of this probably is that, given an infection where there is an outpouring of polymorphinuclear cells with phagocytosis, the invading organisms are so largely inhibited or ingested, that the patient is protected from toxic absorption, whereas in other cases with few pus cells, toxic absorption is more pronounced." Several cases are cited with very slight apparent symptoms, and the accessory sinuses were found infected and drained with gratifying improvement, in osteo-arthritis and articular fibrositis.

In searching for a possible focus, we have probably attached too much importance to the parts easily accessible to examination, and have not paid sufficient attention to the gastro-intestinal tract, and the pelvis, prostate, vesiculæ seminales, tubes, and lymphatic glands; even though Pemberton[6] tells us that Neisser infection in his 400 cases played a nearly negligible rôle in chronic arthritis. McRae[7] thinks there is no evidence to show that metabolism is at fault as an etiological factor, and that such metabolic disturbances are a result and not a cause. Pemberton has shown that there is a lowered sugar tolerance during the active stage of chronic arthritis, which becomes normal when the inflammation subsides.

Trauma, such as fractures in the vicinity of joints or less severe injury to bones and joints, is followed in many cases by osteo-arthritic changes, and is a very definitely determining factor in the development usually of hypertrophic changes, more especially in people of middle age. Exposure to wet and cold in trenches has been followed by various forms of chronic arthritis in our soldiers, some of whom have improved on the removal of demonstrable foci of infection, and as many have shown little or no improvement. "Bacteriological studies show that chronic infectious arthritis is usually caused by strains of streptococci, which are generally non-hæmolytic and of low virulence"[8]. Nichols and Richardson state, the same etiological factor produces in different individuals either the proliferative hypertrophic arthritis, or the degenerative atrophic arthritis, and even in the same individual, one joint may conform to one type, another joint to a second type, with a villous arthritis in a third. There is no reason to suppose these various pathological conditions constitute different diseases, but are the result of varied reactions on the part of the individual to the same etiological factors; infection, toxins, and altered metabolism. In the use of such terms as hypertrophy, proliferation, atrophy, and degeneration, one is apt to become confused, as all conditions may exist in the same joint; hypertrophy of bone, hypertrophy of synovial membrane and atrophy of muscle and bone, with degeneration of cartilage. In one type, hypertrophy of bone in the form of lipping and osteophytes at the articular border predominates. In another type, peri-articular thickening, with bone atrophy, erosion of the cartilage, contraction of muscles and tendons with resulting deformity, even to partial or complete dislocation of the joint, is found. Fibrous or bony ankylosis may or may not occur, and peri-articular tissues, ligaments and tendinous attachments, may be changed into bone, ankylosing the joint completely as in poker spine. It is probably better not to attempt to classify these changes on the above basis, as they are so mixed, it only leads to confusion of ideas when nature refuses to conform her pathology to our classification.

We have all seen splendid results follow the, removal of hypertrophied or diseased tonsils especially in children; but all too often we have had no benefit to our arthritic patients after extraction of teeth, removal of tonsils, and drainage of infected accessory sinuses. So much has attention of late years been focussd on these areas, that the majority of our patients suffering from chronic arthritis, have undergone all this treatment before we see them. Many of their own accord, have had all their teeth extracted good, and doubtful, to get relief. My own experience with antogenous vaccines, foreign proteins, thymus gland, pituitary extract, and the multitude of other recommended remedies, has been of no value that I could determine, but much more useful testimony is that of Dr. Frank Billings from whose paper the following quotaton is taken. "These statistics confirm and substantiate the opinion we have expressed on former occasions, that specific remedies in the form of bacterial antigens are of little or no value in the treatment of chronic infectious arthritis"[9].

The importance of physical therapy cannot be gainsaid, and undoubtedly tends to improve the health of many of these patients, and promotes better circulation in the affected parts, besides having a good psychical effect. The great variety of physiotherapeutic methods, high frequency, hot and cold baths, hot air, baking, and massage, ionization, sprays, etc., all seem to act in one and the same way; that is, to produce hyperemia, and to me, it is doubtful if any one of them has any other action than this. The choice of these is baking and massage, with regulated exercise, and in very chronic conditions manipulation is followed by benefit.

It is much easier to offer destructive criticism than to present something constructive and of real benefit, but physiotherapy has also to its credit, that patients under treatment by it, are not clamoring for drugs and medicines to drink, most of which are without benefit, and many of them injurious. From a strictly orthopedic standpoint, there are two duties; first and foremost, to prevent deformity, and second to correct deformity. All deformity in rheumatoid arthritis, according to Prof. Allan Todd[10], can be prevented, yet many patients, when they have recovered from their disease, are so crippled and deformed they are bed ridden. Deformity is caused by muscular spasm, faulty position, and finally by anatomical changes. Flexor muscles are stronger than extensors, and recovery takes place with limbs flexed. Soft tissues contract when limbs are long held in a flexed position, and the contracted joint capsule becomes adherent to structures inside the joint. The feet should be supported at a right angle; flexion of knees and hips prevented by splinting, wrists kept dorsiflexed; elbows maintained in best position of ankylosis occurs, and pronation of forearm avoided. In manipulative correction of flexion deformity, care must be exercised to avoid injury to shortened vessels and nerves, and extensive degrees of flexion reduced in two or more stages.

One must choose carefully the time to manipulate deformed joints to avoid lighting up a latent infection. It requires careful judgment in deciding which cases to operate on, when to operate, and when to be satisfied with manipulation. Excision of the hip joint is an operation that so frequently gives poor results, it is only advisable in patients with a great deal of pain and bone destruction; after operation, such patients are a long time attaining any degree of usefulness in their limbs. So many moderately deformed joints recover with useful hips on the whole, even more so than cases after excision, that conservative treatment must be given a long trial before rushing into surgical interference in the hip joint.

Excision of the knee is a good operation, in cases of extensive bone destruction, in bony ankylosis in a flexed position, or in joints with restricted and painful movement.

Of arthroplasty in knees and hips, I have small experience, but it is an operation that seems to have grown in popularity very slowly.

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Retrospect

THE ETIOLOGY OF SOME FORMS OF MARASMUS IN INFANCY, ITS TREATMENT BY LACTIC ACID WHOLE MILK.

THE marantic infant has for many decades been a subject of earnest thought and careful research. The etiology strikes deeply at important factors in an infant's nutrition but at which of them has long been a matter of doubt. Congenital anomalies in structure, acute and chronic infections, unsuitable food and unhygienic surroundings have all an important influence on an infant's nutrition and one and all may play a part in the etiology of marasmus or athrepsia; in its treatment all must receive individual consideration. Nevertheless up to the present we have been to a great extent in the dark as to the exact part each of these several factors play in its causation, and why these marantic infants die. No important information has been obtained from the autopsy room. As a consequence much investigation has been undertaken and much speculation has been indulged in. In one group of cases Finklestein has emphasized the conception of "food poisoning" as the important factor and has relegated infections and constitutional abnormalities to the position of mere contributing factors, exerting their influence chiefly in lowering the infant's power of digesting food. The fact that many of the symptoms were aggravated when an attempt was made to give certain elements of food in increased amounts was the original basis for this belief. Careful investigation and experimentation, however, failed to reveal any substance or substances which produced symptoms similar to those met with in acute cases of so-called "food poisoning."

Two types of marantic infants may be recognized. In one acute in character we meet with a rapid loss in weight, cold extremities, small pulse, and scanty urine. The respiration in severe cases is deep and rapid resembling that of "air hunger," and the rectal temperature is high. The resemblance of some of the symptoms to those met with in acid-poisoned animals directed attention to the condition of the blood, and the possible presence of some abnormal acids in its serum; and in 1916 Howland and Marriott demonstrated that an actual acidosis was present; an acidosis not due to any over production of acetone bodies but to the failure of the kidney to excrete acid phosphate. This failure in the kidney secretion was shown to be in great measure due to an anhydraemia arising from an excessive loss of water from the body, a loss occurring in chief amount most frequently from the bowels. As a sequence of the loss of circulating fluid we meet with a compensatory constriction of the arterioles; in many cases, however, this constriction is inadequate and a considerable fall in blood pressure occurs. Marriott has also shown by means of Stewart's calorimetric method that while in normal infants the volume flow of blood through the arms is from 15 to 22 c.c. per 100 gms. of body per minute, in these acutely anhydraemic infants, the flow is greatly diminished; in some instances as low as 2 to 3 c.c. per minute. On this Marriott remarks that if the blood flow through the abdominal vessels is diminished to any such degree as it is in the extremities the functional ability of the intestinal tract to care for food must be greatly diminished. Straub, quoted by Marriott has shown that dogs rendered anhydraemic by a diminished intake of water are very apt to develop diarrhoea and vomiting when fed even on simple food. In these anhydraemic infants Woodyatt and his collaborators have also shown that the action of sugar and salt in the food is to favor the removal of still more water from the body by kidney or bowel and to lessen the amount of fluid available for the reduction of temperature by evaporation. Water evaporation is of even greater importance in the regulation of body heat in an infant than in an adult, but Marriott adds, that although the increased temperature of anhydraemic infants may frequently be explained by an insufficiency of water, infection cannot always be excluded, and in some cases the fever of infection may be attributed in part to an insufficiency of water.

A second type of marantic infant may develop a somewhat similar condition of anahydraemia in a slow, insidious way. An artificially fed infant shows signs of faulty digestion; it

begins to vomit occasionally; the stools vary between constipation and diarrhoea; the body weight fluctuates and then declines. In this condition some parenteral infection sets in, such as a bronchitis or a pneumonia, and under the further impairment of the gastro-intestinal function produced by the infection diarrhoea develops and the weight declines progressively. Infants fed on very dilute milk or on insufficient amounts of proprietary foods never do well. The infant ceases to thrive and wastes to a mere skin-covered skeleton. From the metabolic standpoint the most outstanding features of the condition are an inability to utilize food and a negative nitrogen and mineral salt balance. No anatomical basis for the symptoms of this condition has been found, and the fact that some of the symptoms of the two conditions are identical, and that one often merges into the other, points to a common underlying factor in both.

On an investigation of the protein content of the blood serum of these infants by Marriott and Perkins it was found that the percentage of protein was usually lower than the average for infants of the same age. There was also a diminution of the red blood cells and of the haemoglobin. Further investigation showed that these infants had a lower blood volume, both absolutely and in relation to their wasted body weight, a fact which indicated that a considerable destruction of blood must have occurred along with the wasting or breaking down of other parts of the body. As a result of the decrease in blood volume, the volume of the flow is also diminished, often to less than one-fifth; occasionally to less than one-tenth of the normal. An additional factor leading to the poor circulation is the poorly nourished condition of the heart muscle. It is easy to understand why an infant with a blood volume already diminished by atrophy, should, when that volume is still further diminished readily develop the toxic symptoms characteristic of anhydraemia.

In uncomplicated cases of this chronic marantic condition, there is no increase in the concentration of body fluids, and no bar to free evaporation of water, fever consequently does not occur. There is no increase in the colloidal osmotic pressure of the blood, hence no diminution in the amount of urine secreted, and no accumulation of urinary waste products in the body.

Marriott attributes the cause of this condition to an insufficient intake of food; due to prolonged underfeeding, or to the administration of a food which is either incompletely digested or incompletely utilized by the body tissues after absorption. In this condition of athrepsia, as in that of anhydraemia the indication for treatment are clear but often difficult of fulfilment. We have in the one a lack of nourishment and in the other a lack of water. When these two conditions can be supplied and retained, recovery is possible.

LACTIC ACID MILK FEEDING IN MARASMUS

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THE basic idea in the feeding of lactic acid milk mixtures to marantic infants is to offer the child in a readily assimilable form, sufficient calories to meet not only the basic metabolic needs and the growth factor of a child of marantic weight, but to meet also the caloric needs of a child of the proper weight for the age. The marantic infant needs almost as much food as the normal infant of the same age and much more food when calculated on the basis of his actual weight. On account of the lowered powers of digestion and assimilation it is often impossible to administer such an amount of food in the form of the usual milk mixtures. In whole lactic acid milk mixtures we have a food of high caloric value which is readily assimilated by these infants.

Marriott[1] in his discussion of the pathology of marasmus concludes that partial starvation is the real condition present. Many of the digestive upsets in infants are accompanied by the loss of body fluids by diarrhoea; that is a temporary desiccation of the blood tissue. The degree of this desiccation can be estimated by refractometric methods which determine the percentage of the proteins in the blood. A drop of the patient's serum is examined through a refractometer and the index of refraction is correlated with a given scale.[2] Utheim has shown[3] that the average protein content, estimated by this method, of the blood of the new born is about 6.25 per cent; and the percentage rises gradually to 7 at the age of one year and to about 8 per cent., at two years. Dur-

ing a period of desiccation or anhydraemia, this same method shows that the blood proteins[1] owing to loss of water by the body may be concentrated to 8, 8.5, or even 9 per cent. in a very young infant.[4]. If sufficient fluid in the form of intraperitoneal salines or intravenous salines and glucose is not administered to bring the blood proteins back to their normal percentage (that is to bring the blood volume back to approximately normal) this excess of protein is destroyed;[3] not only is the excess destroyed but the percentage of protein drops below normal, to even 4.5 per cent. and with this destruction the clinical condition which we call marasmus develops. As an end result we have a blood stream not only smaller in volume but also poorer in quality. This blood deficiency can sometimes be replaced by a transfusion of blood from a suitable donor, thereby giving the patient not only increased blood volume but also approximately the correct blood constituents. This may eventuate in rapid recovery; but unless the underlying cause is removed the condition may progress to a fatal marasmus. Utheim has also shown, by experiments on rabbits, that the normal blood volume must be restored before any improvement in the condition of marasmus can take place. Following the termination of the period of partial starvation which produced the condition, there is generally a long "period of repair," during which the blood volume is being built up, and before any notable or steady gain in weight can occur. This means that the digestive tissues and the secretory glands must be nourished by a blood stream of normal contents before they become able to do the work demanded in the digestion of a food of sufficient caloric value to supply the body needs. If the child is fed a sweet milk mixture of what is ordinarily considered the proper dilution for its age, its gastric mucous membrane is unable to secrete sufficient hydrochloric acid to produce the optimum hydrogen ion concentration for the action of the gastric enzyne rennet to be complete; the pyloric stimulation which is brought on by the acid gastric juice, is faulty; "secretin"[5] the hormone which stimulates biliary and pancreatic activity is not formed, and incompletely metabolized food is left in the digestive tract to become a potent agent for further acute digestive upsets. As a consequence, there is poor assimilation of the food offered, and the infant gradually wastes away, living to some extent on its own tissues. The clinical appearance of such a child is unfortunately much too common to require any description here.

From the above statement of the pathology of the condition, it would appear that the important indication in treatment is to procure a food more readily assimilated than the ordinary dilutions of cow's milk. It is to be noted that cow's milk has a much higher "buffer" value than human breast milk; that is to say, more acid or alkali is required to change the chemical reaction of cow's milk than is required for breast milk; hence the gastric cells of the infant fed on cow's milk have to secrete more acid to bring about the optimum hydrogen ion concentration for perfect rennet action, than do the gastric cells of a breast fed baby. By actual experimentation with the two milks we find it requires about three times as much acid to produce this optimum in cow's milk as in breast milk, and the secretion of this increased amount of acid is beyond the powers of the marantic child. The feeding of breast milk would, therefore, appear to be the rational treatment, but unfortunately breast milk is seldom obtainable and is sometimes of questionable origin. Some form of cow's milk mixture becomes then the necessary substitute.

As Marriott says[1] "It is interesting to note that those foods which have been found, empirically, to be the best tolerated by athreptic infants are those which have a lower buffer value or those in which the buffer is already partly neutralized by acid. Breast milk, well diluted cow's milk with added carbohydrate, lactic acid milk and protein milk are examples."

The difficulties in obtaining good breast milk have already been mentioned. It is impossible to give the required calories in a food mixture made from protein milk even with the addition of a considerable percentage of carbohydrates. The difficulty in the use of sweet cow's milk mixtures has been stated. Lactic acid milk is a milk which has been previously sterilized by boiling or pasteurising, and which is then inoculated with a culture of lactic acid bacillus and allowed to stand at room temperature for twelve to twenty-four hours with the production of lactic acid at the expense of the carbohydrate in the milk. It is a whole undiluted cow's milk in which the higher buffer value has been neutralized by the production of an organic acid. In its use the infant's gastric mucous membrane is

called on to produce less acid to secure the optimum hydrogen ion concentration than in the use of other milk mixtures. Hence the milk may be administrated in a more concentrated form, and each ounce of the food mixture will have a higher caloric value. Experience had shown that undiluted lactic acid whole milk may be fed babies (not marantic) at the age of two months with no untoward results.

In the feeding of malnourished and marantic children Marriott finds[6] that the proper basis for the estimation of the caloric requirements of a marantic patient, is the estimated normal average weight for the age, rather than the actual weight. The difference in the weight of a marantic and of a normal baby of the same age, lies chiefly in the amount of fat, metabolically a relatively inert part of the organism, with which the child is clothed. A normal child of four months should weigh approximately eleven pounds, therefore would require some five hundred to five hundred and fifty calories per day, whereas the marantic infant may weigh only six or seven pounds, and if fed according to its actual weight at fifty calories to the pound, would receive only from three hundred to three hundred and fifty calories per day. To gain rapidly and steadily in weight he requires the same five hundred to five hundred and fifty calories per day as the normal infant. To give the necessary additional calories food in a concentrated form must be given, to keep the volume of the daily feedings within the capacity of the infant's stomach. Here lies the real value of lactic acid milk; it can be fed undiluted to even young infants whose digestive powers are much below par, thereby giving the infant the necessary calories for growth and gain in weight. Ordinary sugars can be used in combination with lactic acid milk as in any sweet milk mixture, thereby increasing still further its nutritive value. Even higher percentages of carbohydrate than are usual may be employed, especially if containing a large proportion of a dextrin fermentable with difficulty such as dextri-maltose or commercial corn syrup.

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Study of Exophthalmic Goitre and the Involuntary Nervous System.—Leo Kessel, C. C. Lieb and H. T. Hyman, New York, define exophthalmic goitre as (1) a clinical collection of sympathomimetic symptoms (tachycardia, tremor, exophthalmos, sweating, asthenia, polyrrhea [diarrhea], etc.), associated with (2) metabolic upset (elevated basal metabolism), and usually accompanied by (3) hyperplasia of the thyroid gland. No one of these three components is pathognomonic. Elevations of basal metabolism may occur in other conditions dissociated from goitre or alterations in the involuntary nervous system. Hyperplasia may also occur dissociated from alterations in the involuntary nervous system or elevation of the basal metabolism. Sympathomimetic manifestations may be present with or without hyperplasia of the thyroid gland and with a normal basal metabolism. It is to the last group of symptoms that the authors apply the term "autonomic imbalance." This syndrome differs from exophthalmic goitre only in that the basal metabolism remains normal. Patients with active exophthalmic goitre usually give a history of autonomic imbalance, and those with arrested exophthalmic goitre differ only in presenting a history of crisis. The transition from autonomic imbalance to exophthalmic goitre, occurred in a patient under observation. This led the authors to believe that disturbance of the involuntary nervous system plays an important rôle in the causation of exophthalmic goiter. The fact that stimulation of the involuntary nervous system by epinephrin produces an elevation of the basal metabolism and that this increase is independent of the thyroid gland suggested a more complete study of the involuntary nervous system, especially the thoracolumbar division. Since it is admitted that epinephrin acts only on the myoneural junctions of the thoracolumbar division, the sensitiveness of these patients to the subcutaneous injection of epinephrin localizes the abnormality in the myoneural junctions.—*Jour. Am. Med. Assoc.*, Oct. 7. 1922.

Editorial

THE MODERN CONCEPTION OF MENTAL DISEASE

IN several addresses delivered recently in Canada, Dr. Macfie Campbell, of Boston, has called the attention of the profession to the importance of recognizing mental disease in all its forms, and taking steps for its proper treatment. We regret that lack of space prevented us from publishing in full his address before the Ontario Medical Association, but we think it desirable to lay before our readers many of the important thoughts it contains.

An organized warfare against mental disorders as well as against tuberculosis and venereal disease is demanded on behalf of the social and economic well-being of the community and is one of the important tasks of modern medicine. To indicate the extent of the problem, it may be sufficient to state that in the United States there are more beds for patients in hospitals for the insane than there are for patients in all other hospitals for general or special diseases, including state, municipal and private hospitals. In the fight against disease co-operation is essential. There must be intensive research by the medical man in the sick room and in the laboratory. The known facts of disease must be made available to the community and there must be sufficient appreciation of their value by the public to translate into working machinery the reasoned conclusions of medical science. Without such co-operation, progress is bound to be halting.

The term "mental" in spite of its frequent employment is seldom perfectly understood. It is a term coloured with emotions, and is apt to bring with it unpleasant mediæval associations. By the general public it is deemed respectable to have an attack of nervous prostration or so-called neurasthenia, but if the term "mental disorder" is used it may handicap a career. As a matter of fact, so-called neurasthenia is seldom a disorder of the nerves; it is a disorder of the personality often involving the emotional life of the individual, and may, therefore, be of mental origin. It is a term, however, which has more of a social meaning than accurate medical significance. No person of any importance, even though he should commit suicide, is supposed to have had melancholia, which would be a mental disorder; he is said to have suffered from nervous prostration, frequently attributed to overwork, probably, the rarest cause of disease. The use of the term "mental disorder" is apt even by the profession to be limited to disorders where the symptoms are definitely mental, where the patient is dominated by abnormal moods and attitudes, such as depression, suspicion or doubt, or by false perceptions or beliefs, such as hearing imaginary voices, seeing visions or believing in impossible forms of influence; or where the patient's behaviour is dominated by obscure impulses and cannot be explained along the line of ordinary motivation. These are disorders which even the laity recognize as mental disorders, and are spoken of and referred to as "insanity", which, however, is a legal and not a medical term. There are many other mental disorders, however, which are never thought of as such, and which are not treated as such, because the symptoms are the familiar symptoms of the simple organic disorders. They are mental disorders, however, when their roots lie, not in the disorder of any simple organ or system, as in a nephritis or anæmia, but in the instinctive and emotional life of the individual reacting to the tests of life. A headache is a mental disorder when it is due not to some simple disorder of refraction or to a toxic con-

dition, but to an unwillingness to meet some social situation, deliver a lecture or digest a snub. Sleeplessness is a mental disorder when it is based on emotional tension and irritating memories or hidden fears. The key to many cases of sickness is not found because too often no attention is paid to the rôle of emotional, personal, or mental factors. The physician who has not systematically studied the complexity of human nature with its complicated instincts and emotions and personal factors, who does not realize the influence on the adult of the experiences of adolescence, puberty and childhood, who does not know that emotional reactions and modes of thought in the adult often hark back to the reactions of the child and of our primitive ancestors, takes a certain risk when he discards such facts of the past as irrelevant and assumes that the problem before him is always a definite laboratory disease. One has to realize that man, when thwarted and discouraged in grappling with the real difficulties of life, has a capacity for constructing a world of his own, a world which has great value to the individual and the group, and which under circumstances may become to the individual more real than the objective world in which he moves and has his being.

The mental balance of the individual may be disturbed in other ways than through thyroid disfunction or neurosyphilis or other similar cause of toxic origin. In human adaptation to external situations and to internal conflicts, there is a constant conflict between the higher and the lower, the more recent and the more primitive, between the ethical and the cosmic, between clear objective grasp and consistent purpose on the one hand, and subjective fantasies and blind instinctive strivings on the other. The equilibrium may be disturbed because the higher functions are unequal to the continuous strain or because the blind strivings of the lower functions have become more insistent, either stimulated from within or without, or because a life situation looms up which is beyond the ability of the individual to deal with. The study must include the congenital endowment of the individual, the way in which the experiences of early life have modified later behaviour and character, the special mode in which the individual has tried to compensate for elements of weakness and to strike a balance between conflicting forces. Studies of this nature strip mental troubles of their mystery and obscurity and reduce them to fascinating problems in psychology, which is the most complex branch of the biological sciences. Early touch with the personal difficulties of the child, the organization of a frank and wholesome atmosphere in which all problems can be brought to the surface and frankly discussed, encouragement to face one's limitations in an honest way, and careful study and treatment at the earliest indication of any break in adaptation may bring about striking changes in the mental health of the community.

THE PHYSICAL EDUCATION OF GIRLS

A COMMITTEE was formed in England last year, under the chairmanship of Dr. George F. Still, to consider the advantages or otherwise of physical exercises for girls. On the committee were representatives of the several Royal Colleges, of the British Medical Association and of all the important women's associations interested in the training and development of girls. At the outset the Committee thought it desirable to obtain the views of those who might be expected to have special knowledge of the subject and a series of questions were issued to all such. Altogether 629 replies were received, and

these were submitted to a sub-committee consisting of the medical members of the Committee. Their first report has been recently issued. From it we learn that the medical committee consider that a suitable physical education including games and sports is as beneficial for girls as for boys, but advises that before the more strenuous forms of exercise are undertaken a medical examination should be passed. Discrimination is necessary. Individual girls may be unfit for particular forms of exercise. Competition games are permissible provided they are undertaken after medical examination. Any game or sport may become unsuitable if practised in such a way or in such a degree as to cause undue strain or fatigue. The games that met with most general approval as suitable for girls were tennis, netball, hockey, cricket and swimming. The value of dancing was generally recognized and a majority were in favour of riding, fencing and golf. Foot-ball was disapproved of as being altogether too strenuous.

The use of apparatus demanded supervision as the committee considered that injudicious exercises on some forms may produce injury. Of the value of disciplined exercises, however, under expert direction there was little difference of opinion. By all they were thought to promote the harmonious development of the muscles, and to prevent faulty position and carriage. There was also a general consensus of opinion that the effects of games and physical exercise on the disposition and on the character generally were beneficial. Apart from physical fitness it was considered that they conduce to alertness, resourcefulness and judgment, and encourage a public spirited and healthy outlook. A few, however, thought that in some instances sports tended to foster a love of pleasure detrimental to home and that they were detrimental to the finer womanly qualities.

Physical fatigue unfits for strenuous mental work. A girl who is working at high pressure for examinations should play games less strenuously. Abstention from strenuous games and sports during the menstrual period has been generally recommended but evidence has been brought forward recently to show that complete restriction at this time may be harmful rather than beneficial. The medical members of the committee stated that while they were not prepared to make a final expression of opinion on this point, they considered the evidence so far as in favour of an extensive trial of the voluntary continuance of games, sports and gymnastics at this period. The possibility of any internal displacement they regarded as slight. An important point considered in connection with much strenuous exercise for girls was its influence in after life upon motherhood. Increased muscular exercise if severe and prolonged may increase bony growth and with it the difficulties of parturition, but the increase of muscular power would certainly facilitate labour. The report states that there is no clear proof that strenuous physical exercise has any special influence either upon the prospect or upon the difficulty of labour.

THE INFLUENCE OF THE VARIOUS COLOURS ON THE MIND AND EMOTIONS

A SERIES of charts have been published in Germany to teach by the object method what has been ascertained regarding the influence the various colours exert on the mind, and especially the emotions, and through them on health. White makes a room look larger and lighter, but the effect on an occupant is one of coldness and emptiness. Crimson is stimulating. Children in a room with crimson tinted walls, or in light passing through crimson shades

are said to work with increased energy. Yellow gives a feeling of sun-warmth and a sense of comfort. Dingy rooms are enlivened and made more cheerful by yellow wall paper. Orange exerts the most warmth giving effect, and disposes to cheerfulness. Orange coloured curtains in a bedroom are claimed to have a stimulating influence on the nerves. A pure neutral red may irritate; persons inclined to melancholy may be put into a livelier frame of mind, in a room thus tinted but persons who are nervous should avoid red. Blue has a calming influence and so has green. Patients, it is claimed will sleep better with a night lamp covered with a blue shade, than they will in the dark. Gray if it covers a wide area is barren-looking and dreary. Many patients may be thrown into an unhappy frame of mind by dark and sombre surroundings. These statements may not be equally true for all individuals but they deserve attention in the furnishing of bedrooms and hospital wards.

Editorial Comments

THE SEMON LECTURE AT THE UNIVERSITY OF LONDON.

It is seldom that Canada has been so honoured as it has been this year when two of its University professors delivered notable addresses in England. Prof. H. S. Birkett gave the fourth Semon lecture before the Royal Society of Medicine in London, and Prof. R. F. Ruttan read the Presidential Address before the Society of Chemical Industry. We purpose next month calling attention to some facts of interest to the profession brought out in Prof. Ruttan's address. In this number we publish on another page an abstract of Prof. Birkett's very interesting address on "The Trans-Atlantic Development of Rhino-Laryngology" in which he details the story of the notable achievements of the profession in America in this new field and emphasizes the value of their work in connection with the practical use of the laryngoscope and bronchoscope, adding thus greatly not only to our powers of diagnosis, but also to the efficiency of our treatment.

Is Parentage Determinable by Blood Tests?—The fact that the grouping of persons by isoagglutination—now become generally known since its importance in blood transfusion was stated—appears to be hereditary in nature has led Ottenberg to advocate its use as a means of determining parentage. Without attempting to enter into details, the main point in Ottenberg's conclusion from studying 603 persons in 139 families is that if a child's blood group is in harmony with the blood grouping of the alleged parents, it may be their child; on the contrary, if the child's blood does not group itself in harmony with the parental groupings, it must have a parent other than one of those claimed. We see that, at best, the methods obviously would have marked limitations in practice, and that its results in a given case would fall far short of direct identification of any individual as the parent. Buchanan regards Ottenberg's criteria as unsafe, even if the grouping could be carried back for three generations, because of the possibility that the heterozygous status of a parent might result in the appearance in the offspring of an unexpected, yet legitimate, blood group. Evidently the last word has not been said as to the reliability of Ottenberg's method; and further observations will be necessary to bring it out of the realm of controversy. The conclusion is that at present science knows of no blood test by which parentage can be determined.—*Jour. Am. Med. Assoc.*, Oct. 7, 1922.

Men and Books

ON THE TRANS-ATLANTIC DEVELOPMENT OF RHINOLARYNGOLOGY THE SEMON LECTURE*

THE first knowledge of the nature and use of the laryngoscope was communicated to the profession in America by Hugo Stangenwald in an address before the New York Medico-Chirurgical College on June 14th, 1860. Prof. Jacobi, however, claims in his History of Pædiatrics in New York that in 1856 he had had a small mirror made with which he examined the larynx of one of his patients, but acknowledges that at the time he did not realize the importance of his discovery. Dating from Stangenwald's address, many papers on this subject began to appear in the medical press, perhaps one of the most important being Czermak's essay on "The Practical Uses of the Laryngoscope," which was translated and appeared in the American Medical Monthly, November, 1862.

Although the practical uses of the laryngoscope at this period were regarded by the general profession with some scepticism, its possibilities were foreseen by Horace Green afterwards spoken of as the Father of Laryngology, who recognized the many advantages to be obtained by the use of the mirror, and at an early period predicted that if this instrument could be brought into general use he was confident that the profession would be able to cure diseases now frequently overlooked. Horace Green was one of the first to devote himself exclusively to diseases of the respiratory tract. Associated with him must be mentioned the name of Louis Elsberg, whom Cohen a few years later described as the most accomplished laryngologist in America. Elsberg's attention had been attracted to this subject by a letter from Czermak accompanying a copy of his book. During the next few years Green and Elsberg both contributed many papers to the medical press, and both devised many useful laryngological instruments.

Attention had been attracted to enlarged and diseased tonsils many years before the introduction of the laryngoscope. Philip Syng Physick introduced the first tonsillotome in 1828, but in 1832 Fahnestoch of Pennsylvania introduced the instrument that many of the older physicians will remember; a tonsillotome shaped on the ring knife principle with a needle for drawing the tonsil out of its bed. Much early than this in the later half of the 16th, and at intervals through the 17th century many quaint writings had appeared descriptive of severe and often fatal throat affections evidently referring to attacks of quinsy and epidemics of diphtheria. One of the best of these writings was published by Samuel Bard in 1771 entitled "An Enquiry into the Nature, Cause and Cure of Angina Suffocativa or Sore Throat Distemper" in which he gives a careful and graphic description of what we now recognize as diphtheria involving the mucous membrane of throat and larynx.

The earliest text book of special laryngological interest was the work produced by Samuel D. Gross entitled "A practical Treatise on Foreign Bodies in the Air Passages" published by Blanchard and Lea, Philadelphia, 1854. In 1864 Elsberg published a little monograph on "Laryngeal Medication." This was the first transatlantic work describing the use of the laryngological mirror. The year following was published by the same writer an essay "On the Surgical Treatment of Morbid Growths within the Larynx" which won the prize presented by the American Medical Association. Is this classical work Elsberg shows how quickly he realized and took advantage of the possibilities of the laryngoscope not only as a means of examining and operating upon the hitherto hidden larynx, but as affording an easy and practical method for obtaining fresh pathological tissues for study. Fourteen years later the results of his further studies appeared in an article entitled "Microscopical Study of Papillomata of the Larynx." We cannot to-day accept all his findings as true, yet they show us what manner of student he was. Though a practitioner he was not afraid to attack so obscure and complicated a subject as the histogenesis of tumors.

The first complete treatise on diseases of the throat published either in the United States or abroad was that published by Solis Cohen in

*Delivered by Prof. H. S. Birkett, C. B., before the University of London, July 12th, 1922.

1872. An excellent work showing not only close intelligent observation of cases in an almost unlimited clinical field, but an exhaustive acquaintance with all modern literature on the subject. Other writers soon followed, and American literature in laryngology assumed much prominence and importance.

Special laryngological societies were first formed in America. The first one was the New York Laryngological Society founded in October, 1873, but which did not last long. The American Larynological Association was founded in 1878; its first official meeting was held in the city of New York in June, 1879 under the presidency of Louis Elsberg.

Two years previously the first operation for total removal of the larynx for a malignant growth had been performed in New York by Solis Cohen. A very notable advance in laryngology was made in 1885 when Joseph O'Dwyer without any knowledge of the unsuccessful efforts of Bouchut presented instruments for intubation to the profession. His stimulus had been the fact that from the foundation of the New York Foundling Hospital in 1869 to the inception of his experiments in 1880 not a single case of tracheotomy for diphtheritic croup had recovered. His labors five years later culminated in the production of an intubation tube which has stood the test of time in overcoming not only the acute, but also the chronic forms of stenosis of the larynx and thus saved thousands of lives. Had O'Dwyer lived he probably would have originated the idea of bronchoscopy. He had already recognized the inevitable disaster produced in a bronchus by a foreign body unremoved, and had constructed a special tube for effecting its removal. Fletcher Ingals was the first surgeon, however, to remove a foreign body in this way in 1904, but to Chevalier Jackson must fall the chief credit for perfecting the means and the method at present in use for effecting this valuable surgical accomplishment.

When speaking of the development of rhinology in America, Professor Birkett credits George Catlin, the well-known explorer among the tribes of North American Indians, as one of the first observers to notice the disastrous effects of mouth breathing. The observations as given in his book published in 1861 are as follows: "When I have seen a poor Indian woman in the wilderness pressing the lips of her infant together as it falls asleep in its cradle and afterwards looked into the Indian multitude for the results of this practice, I have said to myself, 'Such a mother deserves to be the nurse of emperors.'' In a later paragraph he drew attention to the injurious effects of mouth breathing in producing nasal polypi, quinsy, asthma, diseases of the lungs, and irregularities of the teeth.

The study of the diseases of the nose which up to 1874 had been given scant attention received a great impulse from the work of the American surgeons Morris Asch, J. N. MacKenzie, Clinton Wagner and Lefferts, whose efforts were first directed chiefly to securing a free passage of air through the nasal passages. The nasal spray had been introduced in 1866 by Solis Cohen; in the seventies efforts were made to effect the diminution in size or removal of hypertrophied turbinated bodies by the application of astringents, by introduction of sponge tents, and afterwards by the galvano-cautery or snare. In 1878 Solis Cohen attempted the removal of bony obstructions by means of the dental engine and nasal drills. In 1882 Fletcher Ingals performed the operation of resection of deviations of the septum, first reflecting the mucous membrane, then removing the deviated portion of the septum, and afterwards replacing the flap of mucous membrane; a great improvement on the crushing methods previously in use.

The importance of acute and chronic affections of the nasal sinuses was not appreciated in the earlier years of rhinology. It was W. H. Daly of New York who in 1883 directed attention to their importance. Not until 1893 were the operative measures for the relief of these affections placed on a definite base by G. W. Caldwell of New York and almost at the same time by Luc of Paris.

About this date also a knowledge of the value in nasal and laryngological operations of cocaine and its derivatives as local anaesthetics, and of epinephrin as a haemostatic was made known to the profession by F. H. Bosworth and by W. H. Bates of New York, both American surgeons, who in this also led the way.

In closing his address, Prof. Birkett called attention to the great strides which had taken place in this specialty during the past sixty years and in which the profession in America had taken a very prominent part.

Therapeutical and Pharmaceutical Items

SPECIFIC PROTEIN THERAPY

THE practitioner must recognize clearly the difference between specific and non-specific protein therapy. In the case of specific therapy, a definite substance is by experiment or test recognized as the cause of the disorder. In non-specific therapy there is no such relation. For example, proteins of the pollen of ragweed cause asthma in certain individuals but not in others in whom some entirely different protein may be responsible. It has long been known that the injection of any protein not normally occurring in the body sets up various protective reactions. Let us take a conspicuous case. If a guinea pig be injected with egg albumin and if, after an interval, it be given a very small dose of the same material (much less than a grain suffices) the guinea pig dies with marked symptoms of respiratory distress. This distress is due to an attack of asthma produced by a contraction of the bronchial muscles. But not only these muscles but all smooth muscle, for example the uterus, tends to be hyperactive. This symptom-complex, the result of sensitization of the cells of the body, we know as anaphylactic shock. By giving very minute doses of the protein repeatedly this sensitization can be reduced or caused to disappear.

It is on this basis that specific protein therapy is undertaken for hay-fever and certain other diseases. But it is found practically that the desensitization or immunity does not last long and it is further possible that all organs are not equally desensitized. Hence the importance of the recent attempt by MacKenzie[1] and Caulfeild[2] to produce not only a general desensitization but also a local one of eyes and nose by the use of dilute solutions of the active protein in water (MacKenzie) or ointment (Caulfeild.)

Reference to the papers noted below, which are but random samples from the literature, will show that in hay fever and certain other types of asthma specific protein therapy carefully and scientifically carried out does yield results. Further study of the phenomena involved both in the laboratory and in the clinic is necessary before the procedure can become a simple and standardized one.

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V. E. HENDERSON.

NON-SPECIFIC PROTEIN THERAPY

IN recent years a considerable number of articles have appeared on the result of treating, by intravenous or intramuscular injection, a great variety of diseases with solutions of various proteins. As a rule these papers report most astonishing improvement, if not cure, and each time one is led to assume a new and important aid in therapeutics has been discovered. A more critical review of the literature shows that the methods described have failed to gain the approval of others, and have not stood the test of further application; the original results have not been confirmed. Reports of these failures have not as a rule appeared in print.

A hurried survey of the current medical journals gives the following comprehensive list of diseases in which this treatment has been reported as successful:—Asthma, hay fever, arthritis, rheumatism, epilepsy, typhoid fever, pneumonia, neuro-retinitis, toxic iritis, septicaemia, intestinal hemorrhage, etc. Many of these diseases run a varied clinical course, and any physician of experience must have witnessed spontaneous cures, arrests or unusually rapid terminations without treatment, or under a type of treatment which fails to effect the same clinical benefit in other cases apparently identical.

The sources of the "protein" used are almost greater in number than the diseases treated and include different commercial peptones, milk, proteose, albumose, egg white, plant proteins, B. Coli, B. friedlander, diphtheria-toxin, cultures made from the intestinal flora, etc.

In carefully controlled experimental work[1] the absolute lack of positive results, which would sug-

gest a value in protein injections, is the rule. So marked was this with regard to at least two experimental infections that Kross[2] states "the recognized clinical dangers of the procedure (including even death) would indicate the need for caution in assuming the therapeutic value of intravenous injections in the treatment of infections."

This is the indefinite situation in which the profession finds itself with regard to the possible use of protein solutions. This indefinite situation is also the explanation why so many commercial concerns are circularizing us with their pamphlets and reports, on the use of "non-specific proteins" as an inducement for us to buy. These inducements are pseudo-scientific arguments, theories, or vague clinical generalizations. In one circular we are told that the treatment of disease *to-day* is non-specific, or at least relatively so; in another a different non-specific protein solution is highly recommended for each disease, including some as diverse in etiology and course as tuberculosis, asthma and diabetes. The indiscriminate or careless employment of these preparations thus recommended to us, promise greater financial return to the companies than benefit to the patient; and any benefit obtained is not far removed from real danger, even death.

It is unfortunately true that a patient may suffer from certain of the diseases mentioned and fail to respond satisfactorily to treatment. Many will under these circumstances express a desire "to try anything that promises even a prospect of relief." The patient, in giving us this carte-blanche, does so with the tacit reservation that our methods will be tempered by clinical experience and scientific knowledge and not guided by the cure-all circulars issued by manufacturing pharmacists or commercial laboratories.

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A. H. W. CAULFEILD,

Connaught Research Laboratories

Treatment of Carbon Monoxid Asphyxia by Means of Oxygen + Co^2 Inhalation.—At a meeting of the Commission on Resuscitation from Carbon Monoxid Asphyxia on Nov. 15, 1921, Yandell Henderson and Howard W. Haggard, New Haven, Conn., were appointed a sub-committee to conduct investigations both in the field and in the laboratory on the treatment of carbon monoxid asphysia by the inhalational methods described. The principal treatments heretofore proposed for carbon monoxid poisoning are bleeding, transfusion, artificial respiration and oxygen inhalation. There is no adequate theoretical reason for bleeding in this condition, but rather the contrary; fot it is probably injurious by further depleting the oxygen-transporting power of the blood. Transfusion of normal blood is probably quite ineffective; for in order to be beneficial, it would need to be performed within one, or at most two, hours after termination of the gassing; and this is in most cases quite impracticable. The authors urge that manual artificial respiration by the prone pressure method should be employed, when respiration has stopped, to start spontaneous breathing. This object may be assisted by administering oxygen plus carbon dioxid simultaneously. Inhalation of oxygen and 5 per cent. carbon dioxid, by causing a very full ventilation of the lungs, rapidly eliminates carbon monoxid from the blood and thus terminates the condition of asphyxia. This treatment is highly effective, inducing rapid and complete recovery, if applied early enough. It requires merely general medical supervision, and may be safely and efficiently carried out by intelligent men of the type composing the emergency crews of a city gas company. Until more definite knowledge has been obtained regarding the conditions in the lungs, brain and elsewhere, subsequent to gassing, and until treatment can be based on such knowledge and has been tested experimentally, it is considered inadvisable to apply any specific treatment in postasphyxial gassing cases. The evidence here reported indicates that oxygen plus carbon dioxid inhalation and rapid elimination of carbon monoxid greatly decreases the liability to nervous and pulmonary asphyxial sequelæ.—*Jour. Am Med. Assoc.*, Sept. 30, 1922.

Correspondence

THE QUEBEC WORKMEN'S COMPENSATION ACT —THE UNOILED COG

To the Editors: The need of a Quebec Workmen's Compensation Act, which provides for some compensation for the medical attendant who cares for the employe in a hospital, is urgently felt. In fact there is no adequate provision for the payment of services to an injured employee, though contractors and employes of labour are, by law, required to furnish medical attendance. In large cities like Montreal the onus falls on the hospitals and the attending surgeons who do the staff work. During the construction of a large building in the summer of 1922, in Montreal, many injured were treated at a leading general hospital. The contractors paid a medical man to attend minor injuries and do minor dressings. He saw all those who were injured when possible. A falling workman sustained a fractured skull, and was sent to the hospital in an ambulance. The hospital admitted him to the public ward, where a surgeon elevated depressed bone, and ultimately restored him to his occupation. During his hospital stay a medical man interviewed the man and the surgeon, and returned a report to the Insurance Company who paid this medical advisor for reporting on the claim. The hospital was paid by the employer, also the ambulance, and he also paid his local medical attendant at the building. The surgeon who did the cranial operation was the only one in the chain of events for whom no provision was made.

In British Columbia, Ontario, and other provinces the law provides that some compensation shall be rendered for such attendance. In Quebec we lack any such provision, and in the reframing of legislation regarding the Workmen's Compensation Act as well as for hospital services to the indigent sick of small municipalities in this province, the medical profession should be considered. The newly formed Quebec Medical Association should properly undertake this as it affects every member in it. Our most westerly province has an excellent, well-working act, which would appear applicable to this province. The matter is one that our various medical societies could very properly attempt to bring before the Provincial Legislature in the immediate future.

A QUEBEC SURGEON

MONTREAL, October 21, 1922.

MECHANICAL CONDITIONS FAVOURING INFECTION

To the Editor: I have read with considerable interest Dr. H. Ernest Paul's article on "Bone suppuration the basic cause of Renal Calculus in twenty cases following war wounds," as in my own work among the same class of patients, I have been struck with the frequency, not necessarily of calculi, but of unilaterally infected kidneys in some of these patients. This particular type of patient is one with a stiff lower limb following a compound fracture of the femur, gun shot wound, or even some injury to the knee. Patients of this type have naturally had a prolonged period of treatment and most probably suppuration. The factor, however, which has most impressed me as a possible cause of this infection is, not the infecting agent itself, but the probability that a very definite mechanical condition may have arisen, inasmuch as the immobile or only partially mobile limb has seriously disturbed the symmetry of the body and altered the natural position of the kidney, so that retention is favoured.

It is doubtful if microbes should shoulder all the blame; in fact considering that the great majority of people live and die without any infection of their urinary tract, the conditions which permit infection must be fairly definite. One can imagine an invasion of microbes in such numbers, or of such virulence that no tissue could withstand them but this must be an unusual or even a hypothetical occurrence. Micro-organisms as a rule develop in the body in injured tissues or in secretions so altered as to offer diminished resistance to their growth. Microbes do not grow on pure proteins.

J. EWART CAMPBELL.

Vancouver, Sept. 25, 1922.

Abstracts from Current Literature

MEDICINE

The Treatment of the Syphilitic Liver and Heart. Wile, Udo J. *Amer. Jour. Med. Sci.*, Sept., 1922.

The author emphasizes the need of special care in the specific treatment of cardiac and hepatic lues. The routine administration of salvarsan in these cases is not without its dangers. Indeed, there is considerable doubt as to its efficacy at all. Dangerous results sometimes have followed the indiscriminate use of salvarsan in these cases. In cirrhosis of the liver, for example, there are certain mechanical factors which are of vital importance in the treatment of the disease, and effect prognosis. Thus, fibrosis is materially hastened by energetic antisyphilitic treatment, and the result may be to hasten the disease rather than to retard it. In cases where gummatous tumours predominate, the energetic treatment is often most successful, whereas, on the other hand, where interstitial lues predominates the success is worse than dubious. Patients may improve as to the syphilis itself but may become worse and die from cirrhosis.

In the absence of laboratory data giving us a clue as to the functional capacity of the normal and the diseased liver, it seems injudicious to employ any form of therapy in which the ultimate process of the disease is affected, so to speak, by the treatment. To a certain extent the same thing occurs in syphilitic myocardial degeneration. The fibrosis may be hastened, while the specific lesion itself may be improved. A remarkable improvement sometimes follows only to be superseded by rapid deterioration, with evidences of accentuation of the original cardiac defect.

For this reason the author holds to the view that arsphenamin and similar preparations are not without their dangers in visceral lues, and prefers medication by mercury and iodide, whose action, again, is slow, and therefore less dangerous. The slow process of repair places less stress upon the normal functioning activities of the viscera, and it would seem wiser to use mercury and iodide as preliminary irritants before adopting the more rapid method by salvarsan.

C. F. MARTIN

Observations on Angina Pectoris.. Levine, Samuel A., J.A.M.A., September 16th, 1922. Vol. 79, No. 12.

From a close clinical and pathological study of 103 cases of angina pectoris a few observations have been recorded. The disease is more common in men than in women. It is rarely found in poorly developed or undernourished individuals. In only six cases was there any history or clinical evidence of syphilis; it would seem that this as an etiological factor has been overestimated. Organic valvular disease is rarely an associated condition. In the majority of cases there are no murmurs. The blood pressure is as a rule high, averaging 160 systolic and 90 diastolic. In most cases the heart is hypertrophied. Only one case showed persistent auricular fibrillation. Comparing this with the usual myocardial conditions, there seems to be some incompatibility between angina pectoris and auricular fibrillation. A. H. MACCORDICK

Psychoanalysis and its Critics. Meagher, John F. W. *Psychoanalysis Review,* July, 1922.

Before reviewing the chief criticisms directed against psychoanalysis the writer offers his opinion about its principles and practice. The unconscious, he states, is essentially our historic past and our real psyche. Psychoanalysis survives or falls on the theory of the unconscious. Its chief field lies in the diagnosis and treatment of the neuroses and in certain phases of the psychoses. In these, psychological determinants are the most important factors. Metabolic disturbances may be found, but they are secondary to the psychogenetic elements. By means of analysis these are laid bare and the patient gains insight into the cause of his neurosis. He learns to see himself as he really is, and secures greater mental freedom and moral independence. Much of the adverse criticism of psychoanalysis, the writer claims, is

based on prejudice and lack of knowledge. Wild psychoanalysis, as carried on by quacks and unqualified persons, is no proof of falsity of Freud's theories and is an abuse of a procedure of real value. An eminent psychologist, Dunlop, of Johns Hopkins, a severe critic of psychoanalysis, declares that it is linked up with mysticism. Mysticism, the writer states, is a third kind of knowledge which is intransmittable, but psychoanalysis makes no such claim. Anyone can learn psychoanalysis if he will but give it time and attention. Perfection, however, can only be attained by years of hard study.

Like any other therapeutic method, medical or surgical, psychoanalysis can do no harm if improperly employed, i.e. if cases are improperly selected, technique faulty, or the analysist inexperienced. The writer quotes Jung's statement that the objections to the sex theory are not intellectual, but originate from moral indignation, felt by most people, at anything sexual. But a method cannot be rejected on aesthetic grounds only, and all well known psychopathologists admit the great importance of sex in the neuroses.

A. G. MORPHY

OTOLOGY and RHINO-LARYNGOLOGY

Disease of the Otolith Apparatus. Hunter, Robert J. *J. A. M. A.*, March 6th, 1922.

The writer thinks this is the second case so far reported in literature, the first having been cited by Barany. The clinical history is fully given but does not lend itself well to abstracting. The interesting features of this case, Hunter says, are the following:—

(1) The history of incidence of nystagmus after a blow.

(2) The significant fact that this had continued twelve years, and that, except in his "favorite position," the nystagmus was constant and that there has been no vicarious symptoms of function such as we find after injury to the semicircular canals.

(3) The nystagmus was almost entirely absent in his "favorite position" but resumed constantly as soon as the head was moved from this plane, no matter how slowly and carefully it was moved, and at the same time the past-pointing which was normal in his "favorite position" became abnormal in other positions.

P. G. GOLDSMITH

The Diagnosis of Brain Tumours by the Barany Tests. Fisher, Lewis. (With reports of cases proved by operation or necropsy). *J. A. M. A.*, March 20th, 1922.

This paper calls attention to, and emphasizes the value of, a complete ear examination as an aid to the neurologist and brain surgeon. Examinations of a large number of brain cases over a period of many years have shown that lesions in certain locations produce a definite group of phenomena on stimulation, more definite for some lesions and less definite for others. Tumours, however, situated in the cerebellopontine angle give the most constant complex of findings and in many cases offer the only means of accurate localization. The Barany tests are practically absolute and may lead to accurate diagnosis before any definite and discernable clinical data are available.

The typical picture in brief is as follows. There is total deafness with no response whatever from the horizontal and vertical semicircular canals on the affected side. On the opposite side the hearing is good, the vertical canal produces no response at all while the horizontal canal produces good nystagmus, vertigo and past-pointing.

Tumours of the posterior fossa generally show rather definite findings on vestibular examination. The vertigo and past-pointing are particularly affected, while the eye responses are normal or exaggerated. Fisher believes these tests to be of great value in the differential diagnosis between a subtentorial or supratentorial lesion, but are helpful to a lesser degree in lesions of the middle or anterior fossa.

Pituitary body neoplasms exert their first pressure against the vestibulo-ocular tracts. Examination of a large number reveals an exaggerated nystagmus, but normal vertigo and past-pointing.

P. G. GOLDSMITH

Syndrome of Malignant Tumours of the Nasopharynx. New, Gordon B. *J. A. M. A.*, July 1st, 1922.

At the Mayo Clinic during the past six years, New has examined seventy-nine cases. These tumours include only epitheliomas and lymphosarcomas, not fibrous or myxomatous. From a study of this series he believes they are much more common than we think and in many cases have very slight nasal or naso-pharyngeal symp-

toms. Many patients are treated without discovery of the tumour because the syndrome which is present is not generally known.

Only thirty-eight of the seventy-nine patients presented nasal or naso-pharyngeal symptoms such as bleeding or nasal obstruction. Twenty-one had symptoms referable to the eye, diplopia due to paralysis of the external rectus being the most common. Twenty-nine complained of the ears, pain, deafness, tinnitus or fullness. Enlarged glands in the neck were present in fifty-one patients, extensive involvement often being associated with a small primary growth. Seventy-nine operations had been performed on these patients without the naso-pharyngeal disease having been discovered. The writer says the syndrome presented is quite typical and the finding of a small naso-pharyngeal tumour will usually clear up the diagnosis in cases in which it had previously been impossible.

This paper is illustrated and an abstract of the discussion is added. P. G. GOLDSMITH

The School Child Before and After Tonsil and Adenoid Removal. Davis, Littleton. *J. A. M. A.*, April 22nd, 1922.

This is a statistical study of 7500 children with reference to the effect of time and natural development of the child on the pharyngeal lymphoid tissue. After two years of observation, he makes the following conclusions: (1) In spite of thorough operations, cervical glands enlarge as often after as before tonsil removal; (2) The incidence of heart disease in children referred for tonsil and adenoid operation is very small; (3) Seven to ten years of age is the period at which one may expect greatest relief from operations; (4) Early removal gives mechanical relief for a time but the original cause of the growths, whatever it may be, is present and active until a much later period.

P. G. GOLDSMITH

Local Spasm of the Oesophagus and Impairment of Deglutition Following Local Injury of the Pharyngeal and Oesophageal Mucosa. Carlson, A. J. *J. A. M. A.*, March 18th, 1922.

The patient while working on a problem in physiological chemistry, received a boiling concentrated solution of sodium hydroxide in the back of the throat without its having touched the lips or anterior part of the tongue. Within five minutes the throat was swabbed with dilute acetic acid, but five minutes later he was unable to swallow. Marked oedema of the epiglottis and ventricular bands took place twenty minutes later. Deglutition was impossible for five days and, when in a small degree restored, it was found that about one-third of the epiglottis was sloughed. Body weight was reduced 20% in six weeks. As only fluids could now be swallowed the œsophagus was dilated, after the method of Sippy, and dilatation was eventually followed by normal swallowing.

P. G. GOLDSMITH

A Pedunculated Lipoma of the Oesophagus. Vinson, Porter P. *J. A. M. A.*, March 18th, 1922.

S. V. J., aged 62 gave a history of having coughed into his mouth an elongated piece of flesh which was thought to be a growth attached to the uvula. The growth was easily swallowed but his throat felt sore and swollen for several days.

He had no further trouble for six years, when following a heavy meal he became nauseated and in vomiting ejected a piece of tissue long enough to protrude into his mouth. He tried to bite it off but lack of teeth prevented him, and he again swallowed the tumor. His throat felt uncomfortable and his breath was very offensive for a few days. Three weeks later a similar accurrence took place. At no time was there any dysphagia.

Oesophagoscopic examination revealed a tumour just below the introitus attached to the right wall of the gullet by a pedicle 3/8 inch in diameter. No attempt was made to pull the tumour out of the mouth at that examination but following breakfast a week later, vomiting was induced and the tumour again regurgitated. It extended four and a half inches beyond the incisor teeth, and the tip measured 2 9-16 inches in circumference, gradually tapering to the base. It was rather firm and covered with normal mucous membrane, except for a small ulcerated area near the tip.

Under local anaesthesia the tumour was removed through an external incision in the neck. The raw surface left by the severed base was closed with normal mucous membrane. A small drain was inserted which was removed in seventy-two hours and the neck healed without infection. The length of the tumour after removal

was found to be 8¾ inches and a section showed it to be a simple lipoma. In a search of the literature, Vinson has been unable to find a similar case. Excellent illustrations accompany this paper. P. G. GOLDSMITH

SURGERY

The Early Signs and Symptoms of Cholelithiasis. Moynihan, Sir Berkley. *Brit. Jour. Surg.*, July, 1922, p.127.

In this article the writer draws attention to the many conditions of gall-bladder disease which may simulate, very closely, gall-stones. Occasionally cases diagnosed as cholelithiasis have been operated upon and no gall-stones found. Such cases the writer now regards as examples of early gall-bladder disease and shows from his own experience that cholecystectomy is required for their relief. This type of case includes the various stages of the "strawberry gall-bladder" characterized by inflammatory changes associated with the deposit of lipoids and cholesterin esters in the stroma of its mucosa. He also points out that the symptoms so commonly associated with impacted or floating gall-stones are really those of cholangitis or infection of the gall-bladder. Stones in the gall-bladder or bile ducts very often do initiate or aggravate such an infection which may exist in varying degrees in the absence of gall-stones. Infection of the gall-bladder may occur through various channels.

(1) Very rarely it may ascend from the duodenum. Pigments introduced into the rectum after cholecystostomy have been recognised soon after in the bile drainage.

(2) It may descend from the liver. The writer emphasizes the fact that organisms may reach the liver by the portal system not only from the digestive tract, but also from the spleen. He mentions the close associations, clinically, of splenic enlargement and gall stone disease, and cites a case which was cured by irrigation of the biliary ducts (which were previously filled with sand) by Carrell's method, and by splenectomy.

(3) It may reach the biliary passages by the blood stream. It has been proved experimentally that some organisms, chiefly streptococci, have an "elective affinity" for the gall-bladder and bile ducts. B. typhosus reaches the gall-bladder by the blood stream, and not by the bile. Gosset and others are quoted as having shown that gall-stones may sometimes originate inside the villi of the mucosa, later becoming detached as their size increases.

(4) By way of the lymphatics infection may reach the gall-bladder. Not infrequently inflammatory changes in the liver accompany cholecystitis. Sudler is quoted as having shown the intimate connection between the surface lymphatics of the liver and those of the gall-bladder. A close association with the lymphatics of the pancreas has also been demonstrated.

(5) Infection of the gall-bladder by direct continuity may occur as in cases of gastric or duodenal ulcer with the gall-bladder adherent to them.

Examination of a large number of gall-bladders, shows that infection begins as frequently on the mucous surface as it does on the peritoneal covering. Subperitoneal deposits of fat are frequent even in early cases. Gall stones are found only in the later stages of infection and may be formed either within the cavity or within the walls of the gall-bladder.

The writer firmly believes, however, that gall stones do cause symptoms but not those commonly ascribed to that condition in text-books. These symptoms are entirely referable to the stomach and include flatulence, distress after eating, "acidity," "waterbrash," nausea, and the feeling that the stomach is overfull even after a small meal. Their persistence is even more suggestive.

A solitary cholesterin stone is present in some cases without evidence of antecedent infection and causes no symptoms until it becomes inpacted in the cystic duct. This is mentioned as the one exception to the writer's statement that infection is always associated with gall stones.

The pathology of these early changes is very interesting and amounts to a loss of colour and lustre on the part of the gall-bladder followed by the whiter and more opaque appearance of its walls which are slightly thickened. Deposits of subperitoneal fat occur and later there appear oedema, patchy reddening and adhesions. The bile is thicker and darker than normal. The mucosa is oedematous and of the "strawberry" type. The later stages show ulceration, diverticula and sometimes papillomata. Still later cicatricial tissue appears.

H. MAITLAND YOUNG

A Comparison of Cholecystostomy and Cholecystectomy. Sherren, James. *Brit. Jour. Surg.*, July, 1922, p.135.

It is the author's opinion that there is an extremely scant basis for controversy between the relative merits of cholecystostomy and cholecystectomy, and he undoubtedly favours the latter. A great change of opinion on this subject has occurred during the last ten years. In his own experience, one decade ago, he removed 29 gall-bladders in 100 cases of cholelithiasis. In contrast, he states that he has removed 94 gall-bladders primarily and two more secondarily after a very short interval in his most recent series of 100 cases. Moreover, he claims infinitely better results from cholecystectomy both in regard to the immediate death rate, and also as to the freedom from complications and recurrences.

The principle he has adopted is to treat the disease of the gall-bladder itself and not the products of that disease (e.g. gall-stones). Therefore he advocates cholecystectomy to be done primarily whenever the risk of such an operation is not greater than one consisting of two stages, that is, preliminary cholecystostomy followed by cholecystectomy three or four weeks later. In support of his views he states that in many cases where external examination of the gall-bladder and neighboring lymphatics shows nothing abnormal, cholecystotomy often reveals much. Such conditions as tiny calculi, "strawberry" gall-bladder, small adenomata and even some very early cases of carcinoma would otherwise be overlooked. In all the conditions mentioned cholecystectomy is indicated. In seven cases of cholecystitis with marked symptoms in which no calculi were found, he treated by removing the gall-bladder. All were cured of their symptoms.

He reports 184 cases of cholecystectomy done over three years ago for calculi confined to the gall-bladder with 6 deaths, 3 from lung complications. This series represents 33 acute cases, and symptoms recurred in none.

During the same period 152 cholecystostomies were done for stone, including 46 acute cases. Four deaths resulted. Symptoms recurred in 8 acute cases and in 21 non-acute. 75% of relapses occurred within two years. He reoperated upon 18 of this group, 3 having chronic cholecystitis only. Stones had re-formed in the remainder. In all, the common bile duct was free. Five patients died, within four years, of carcinoma. All his cases were carefully followed up; he communicated with either the patient or his doctor at least once a year.

Cholecystectomy was done in 30 chronic cases for diseases not associated with stones with permanent cure of symptoms, no deaths resulting. Of 9 similar acute cases 4 deaths resulted from gangrene of the gall-bladder. The writer purposely does not include cases of stone in the common duct and states that his procedure in such cases is removal of the gall-bladder and drainage of the duct itself. H. MAITLAND YOUNG

A Study of 485 Cases With Acute Lesions of the Genitalia. Driver, James R. *J.A.M.A.* September 9th, 1922. Vol. 79, No. 11.

In a series of 485 acute primary lesions 221 were diagnosed positively as syphilis by means of the dark stage illuminator, while 117 considered as negative were proven later to have been chanceroids. The clinical diagnosis of primary syphilis is not satisfactory. The most efficient means at our disposal is the dark stage. This is positive several weeks before the Wassermann reaction develops. In cases of negative dark stage findings, however, repeated subsequent Wassermann tests should be done. If local antiseptics are used, the chance of positive dark stage findings is greatly reduced. Among the cases met with giving negative tests for syphilis were: 1 of carcimoma, 3 of tuberculosis, 1 of kraurosis, 5 of scabies, 7 of folliculitis and 11 of balanitis, the latter being due apparently to strong "preventive" antiseptic solutions. A. H. MACCORDICK

ANAESTHESIA

The Anaesthetic Properties of Pure Ether. Steele, Raymond L. and Bourne, Wesley. *Jour. Amer. Med. Ass.* July 29th, 1922, p.375.

It has been stated recently that pure ether owes its anaesthetic properties to the presence of impurities such as ethylene, carbon dioxide, and ketones, and that ether itself is not an anaesthetic. These impurities may be formed during the Williamson sulphuric acid, alcohol process, the usual way in which ether is made. To test the truth of this statement the authors

prepared ether by bringing sodium ethylate and ethyl iodide together in alcohol solution. The only impurities contained in their ether were .04% gethylene and a still fainter trace of ethyl iodide.

In six cases where this ether was used the induction and maintenance of anaesthesia was found very satisfactory. No preliminary morphia and atropine having been used, induction was short and not unpleasant, there were no signs of irritation such as salivation, holding the breath, coughing or struggling. The course of anaesthesia was quiet and uneventful and recovery rapid and uncomplicated.

W. B. HOWELL

The Suprarenal Gland in Anaesthesia. Corbett, J. S. *Jour. Am. Med. Assoc.* Aug. 12th, 1922.

The writer belives that there is epinephrin exhaustion in certain cases which take ether badly, such as cases of typhoid, starvation, haemorrhage, severe infections, late intestinal obstruction, shock and exopthalmic goitre. Epinephrin exhaustion is also a result of prolonged etherization apart from any other condition. Vasomoter balance is maintained ordinarily by minute amounts of epinephrin in the blood. In haemorrhage vasoconstriction takes place as the result of the pouring out of an increased quantity of epinephrin and the blood pressure is kept up to a certain extent till the epinephrin is exhausted when fall of blood pressure and collapse take place.

The writer made 350 experiments in animals with a view to studying the residual epinephrin after various procedures, and after death from various causes. A table is given showing his results. The amount of epinephrin in the adrenal of a normal animal is taken at 100%. After death from haemorrhage there was found to be only 26%. After one hour's etherization 33%; after chloroform 35%; after nitrous oxide for four hours 65%.

Corbett believes that when there is exhaustion of epinephrin there is nothing with which shock can be controlled unless we increase blood volume by transfusion and so obviate the necessity for vaso constriction. Epinephrin exhaustion from ether anaesthesia is diminished by the use of morphine. He ascribes the comparative safety of nitrous oxide to the fact that it does not exhaust the epinephrin to the same extent as does chloroform or ether. W. B. HOWELL

How Apothesine Compares With Other Agents Used in Spinal Analgesia, With Special Reference to a Threatened Accident in a Case of Prostatectomy. Gelpi, Paul J. *New Orleans Med. and Surg, Jour.* Feb. 1922. Vol. Lxxiv., p.586.

The writer has used spinal analgesia in 1200 cases. He has used cocaine, stovaine and tropococaine as well as apothesine and finds the last named as satisfactory as any of the others. Analgesia appears in four or five minutes. The intensity and the duration are entirely adequate. The after effects are slight; occasionally a transient headache, nausea, rarely vomiting. Retention of urine occurred in a few cases, but was probably due to the nature of the operation.

Experiments on animals have demonstrated that its toxic action is similar in kind and degree to that of novocaine. Adrenalin is its most prompt and powerful antidote.

Gelpi reports a case of enucleation of the prostate where he used apothesine. The patient became pulseless immediately after the injection, respiration became laboured and the colour ashy. However, the patient responded to stimulation by digitalin, strychnine and ammonia and recovered. He thinks that in this and two other somewhat similar cases the symptoms may have been due to the head being too low.

W. B. HOWELL

Some Ophthalmologic Manifestations of Diseases of the Nervous System.—Joseph P. Israel, Tex., states that every patient complaining of headache, especially of migrainous type, should undergo refraction and the diet should be regulated or watched, as this condition is frequently due to an astigmatic error or some disturbance in the gastro-intestinal tract. In the examination of the ocular muscles, it is well to bear in mind the importance of convergence paralysis, as it is a symptom more common than is generally believed, and frequently of syphilitic origin.—*Jour. Am. Med.*, Oct. 7, 1922.

News Items

ALBERTA

ALBERTA MEDICAL ASSOCIATION

THE annual convention of the Alberta Medical Association was held in the Medical Building of the University of Alberta, Edmonton, September 6th, 7th and 8th, 1922.

September 6th at 10.15 a.m. the President, Dr. Archer, called the meeting to order. As there was not a quorum present, business could not be proceeded with, but the president outlined for informal disussion the problems relating to an extension of the Workmen's Compensation Act to cover farm labourers and transients. Dr. Swartzlander gave an outline of the circumstances in the dried out areas where a moratorium has been declared to cover farmers. At the present time, doctors are not classed as preferred creditors and cannot collect any fees. He gave notice that he would move for the appointment of a committee to wait on the government with a view to obtaining this privilege for doctors.

Dr. Harold Brown advocated an alteration in the health act, making the municipalities responsible as backers to guarantee payments of medical bills of indigents and residents in drought areas.

It was stated by Mr. Hunt that according to Mr. Stirling, chairman of the Workmen's Compensation Board, all miners must come under the W. C. B. for accidents. All contracts made between mine operators and doctors must be approved by the W. C. B. Mr. Hunt also read a report of the Executive Committee for the past year, and afterwards reported the suggestions made by various doctors throughout the province.

The result of the recent plebiscite on suggested changes in the Workmen's Compensation Act was as follows:

1. Would you be in favour of enlarging the scope of the Workmen's Compensation Act to include regular hired help on farms? Majority for, 8.
2. Would you include ordinary transients or floaters? Majority against, 3.
3. Would you include farmers and their sons? Majority against, 109.
4. Should sickness in the workman be included under the Act in addition to accident as at present? Majority against, 29.
5. Would you include the family as well as the workman under the enlarged scope of the Act? Majority against, 106.
6. If care for sickness were provided for, should that come under the jurisdiction of the Department of Health, instead of the Compensation Board? Majority for, 30. The meeting then adjourned.

The second session of the Convention opened at 2 p.m.

Dr. McMannus of Bashaw read a paper entitled "The Medical Officer of Health," pointing out the difficulties of the country practitioner in carrying out the duties of a health officer. He advocated the appointment of specialists not otherwise engaged in medical practice, where possible, as medical officers of health. They should be highly trained men of independent position, politically and financially. Their districts and duties should be clearly limited and defined.

Dr. Bazin, of Montreal, then delivered the Lecture on Surgery. His subject was "Destruction and repair in injuries of bones and joints with clinical application in the treatment of compound fractures." Eighteen bone specimens from the Canadian War Museum were exhibited to illustrate the lecture. Dr. Bazin pointed out that the principles employed in military surgery during the late war are practically all applicable to civil practice. After much experimental work there was a return to what might be called physiological methods. After showing the gross specimens, a series of lantern slides made from their specimens was thrown upon the screen. The pathology of these specimens was pointed out and explained with an outline of the treatment indicated. He stressed the mechanical cleansing of wounded tissues including bone, and advised the removal of devitalized bone fragments. He pointed out that bone received its chief supply of nutriment from the medulla, and a lesser amount from the periosteum. In young bones the chief sources of repair were from the cancellous bone, and from the deep or osteogenetic layer of periosteum. He advised the removal of all detached bone fragments, and also the ends of large fragments from which the periosteum had been stripped. He then outlined the open and the closed methods of treatment for infected joints.

Prof. McPhee, of the University of Alberta, outlined the course of Medical Psychology as given by the University of Alberta. He then proceeded to a definition of the neuroses and their classification, accepting the classification of Freud, without accepting or rejecting Freud's sexual theory of origin.

Dr. MacKay of New Westminister, B. C. read a paper on "The diagnosis of early mental conditions."

A joint public meeting of A.A. of R.N., A.H. A., and A.M.A. was held in Convocation Hall,

University Building, Wednesday evening, 8.30. Rev. Father Cameron, of Calgary, occupied the chair. Acting Mayor Bury, of Edmonton, in a felicitous address congratulated the members of the various organizations represented at the joint meeting in their efforts for the health of the community, and gave them a hearty welcome to the city. Dr. Stockton, of Calgary, presented a paper on "Everyday Paediatrics." He suggested the less frequent use of drugs; great many had been overworked to the detriment of the child. Common sense and science would bring best results. In cases in which the mother's milk was insufficient for the needs of the child, additional feeding should be given immediately, and so as not to increase the frequency of the feedings.

Hon. R. G. Reid brought greetings and commented highly on the work that is being accomplished in Alberta along health lines. He considered the problem of public health almost entirely a question of education. Dr. Archer of Lamont, President of the Alberta Medical Association, gave an interesting talk on the advancement of medical science during the past few decades. The high death rate of infants in Alberta was largely due to parental lack of knowledge, and it was up to the medical men to educate the parents. The Medical Association was arranging a Health Week this Fall with a view to giving the public some information along the lines of preventable medicine, cancer, tuberculosis, and venereal diseases. Dr. Stanley of Calgary, President of the Alberta Hospital Association, discussed the question of the efficiency of the hospitals in the province. While Alberta was ahead of any other province in Canada, in health matters, yet much remained to be done before the whole population was reached. Doctors, nurses, and hospitals working together were necessary for success, but in many places no hospital accommodation was provided. The large cities had efficient hospitals and there were many other hospitals owned and operated by private corporations, churches, etc. as well as good rural municipal hospitals, doing invaluable work, but the present system would have to be changed before hospitals would be within the reach of all. In many places the difference between the fees paid by residents and those living outside the hospital district were so great as to almost bar the sick from hospital assistance. Some system should be devised whereby all would have equal privileges, and a general fund created to more equally distribute the burden of taxation. It must be locally governed, but to a greater extent provincially assisted and such assistance on the basis of earned grants similar to school grants according to actual service rendered, and not upon the flat rate as at present.

On September 7th, from 8-11 a.m. clinics in medicine, surgery, and the various specialities were given at the general hospitals. At 11 a.m. Dr. A. T. Bazin gave a Clinical Demonstration on Differential Diagnosis in Acute Abdominal Conditions.

In the afternoon Dr. Learmonth of Calgary read a paper on the Early Diagnosis and Treatment of Carcinoma Uteri. He pointed out that the majority of cases were diagnosed only when too late for treatment, and urged the education of women to recognize the early signs and symptoms. He outlined the causes and modern treatment and urged medical men to disseminate as much information on the subject as possible. Dr. Malcolmson of Edmonton read a paper indicating the recent advance in diagnosis and treatment by x-ray and radium giving a summary of the results of his own experience in these lines. Dr. Gilmour, of Winnipeg, gave a lecture on "Diabetes Mellitus." He divided the treatment into two stages, (a) a preparatory stage where the efforts are directed towards freeing the urine of sugar; (b) Active dietetic treatment after obtaining a sugar free urine, gradually raising the threshold of tolerance for fats and proteins. Prof. Collip, University of Alberta followed with an outline of the investigations carried out by himself and associates which has resulted in the discovery of the internal secretion of the pancreas which they have named "Insulin." He demonstrated the action of insulin on rabbits and the neutralizing effect on a hypodermic injection of sugar. The marvellous results were almost instantaneous.

At 5.30 p.m. the Convention went into a business session.

On motion of Drs. Swartzlander and MacDonald the report of the special Committee appointed to consider medical collections in the drought area was adopted.

The following two resolutions from the Alberta Hospitals Association were endorsed:

(1) Moved by Dr. H. R. Smith and seconded by Dr. G. D. Stanley, that whereas it is universally recognized that the supplying of facilities for educating and training pupil nurses is a public service, the adequate performing of which entails considerable outlay to the hospitals maintaining training schools; therefore be it resolved that "The Special Committee on Legislation" be requested to bring this matter to the attention of the Provincial Government with request that suitable remuneration be provided for hospitals maintaining satisfactory training schools. (2) Moved by Dr. Smith and seconded by Dr. G. D. Stanley, and resolved, that "The Special Committee on Legislation" appeal strongly to the Workmen's Compensation Board to revise the schedule of hospital fees, so as to make the minimum fee conform to the actual average cost per patient per day of operating the hospitals of the Province.

It was moved by Dr. A. R. Munro and seconded by Dr. J. S. Wright and carried that a committee be appointed at this meeting to review

the Workmen's Compensation Act with the purpose of making such recommendation re amendments to the W. C. Act in order that this scheme of Workmen's Insurance may be made acceptable to the medical profession. That this committee be asked to bring in a report to a special meeting of the A.M.A. to be called some time prior to the next meeting of the Legislative Assembly. That the proposed amendments be presented to the government before the next session of the Legislative Assembly.

The nominating Committee then presented its report as follows: President, Dr. A. F. Anderson, Edmonton; 1st. Vice-Pres., Dr. Wm. Hackney, Calgary; 2nd. Vice-Pres., Dr. E. W. Allin, Edmonton; Secretary, Dr. W. H. McGuffin, Calgary; Treasurer, Dr. T. J. Costello, Calgary.

On motion, the following resolutions were adopted. (1) That this Association wishes to congratulate Dr. Collip on his work in connection with the production of insulin, and to express its pride in having within its membership a worker who has contributed so much to the alleviation of suffering in diabetes. (2) This Association wishes to place on record its appreciation of Dr. Gilmour's visit, and of the exhaustive and scientific paper which he has presented to this meeting.

On Thursday evening the members of the convention were the guests of the Academy of Medicine, Edmonton, at dinner at the Country Club, where a most enjoyable time was had.

On Friday, September 8th, Clinics were given at the various hospitals from 9 to 11 a.m. Dr. Gilmour of Winnipeg gave a clinic on nephritis at the Strathcona Hospital at 11 a.m.

Afternoon Session at 2 p.m. Two reels of moving picture film were run, showing the development and spread of gonorrhoea and syphilis in both males and females; and an interesting paper was read by Dr. Harold Orr on "Recent developments in the study and treatment of syphilis."

Dr. Emerson Smith of Edmonton gave a paper on Pyelitis. He defined and gave the modern views on the causation of Pyelitis, stating that it was the result of a blood born infection. Cystitis, he stated, was the result of a descending infection from, rather than the cause, of a pyelitis. He stated that bladder symptoms were very frequently an indication of kidney infection, and pointed out that a gonococcal pyelitis was very uncommon, and advised a careful routine examination of the whole genito-urinary tract in all cases. He then gave the differential diagnosis of pyelitis from other confusing conditions. He also gave a short outline of treatment. (1) Find out the source of infection and remove it, usually disorder of colon. (2) Forced fluids by mouth. (3) Alkalinization of urine. (4) Rest. (5) Relieve pressure (strictures, etc.) to give better drainage of ureters. (6) Vaccine. Catheter specimens of female urines should always be taken and cultures of all urines made.

Dr. McPhatter gave some points on goitre. He said there was need of further study of the sympathetic nervous system before the thyroid gland and function are understood. In discussing the anatomy of the thyroid gland he said it was the most vascular of all organs. Its secretions and functions are not understood.

Dr. Stanley outlined the proposed alterations in the Constitutions of the Council of the College of Physicians and Surgeons, whereby councillors were elected for two years instead of four, and four of the seven would be elected in the even numbered years, and three in the odd years. Drs. A. F. Anderson and Costello moved that the annual fee of this Association be twenty-five dollars. Dr. Stanley proposed that Dr. Anderson's motion be amended, to add: but that the executive be instructed to enter into negotiations with the Council of the College of P. & S. with a view to making such financial arrangements with that body as to meet the financial obligations of the Association, as far as the officials and office expenses of the Association are concerned. Approved.

Ninety-three members signed the register, of whom thirty-six were from points outside Edmonton and Calgary. In addition quite a number of men from Edmonton and outside attending only a session or two did not register.

NOVA SCOTIA

An innovation of some interest and importance was inaugurated recently in Halifax, when the Medical Faculty of Dalhousie University gave a short course of post-graduate instruction. The idea was the outcome of a meeting of the Maritime Branch of the American College of Surgeons and was undertaken with some little trepidation by the lecturers. It was felt that the Medical School was small and more or less isolated from the greater centres of scientific activity. However, the venture proved to be a complete success. About thirty physicians from various parts of the Maritime Provinces, and one from the United States, were in attendance. The course lasted one week and was free. Medical and Surgical Clinics were held daily in the Victoria General Hospital, in the Halifax Children's Hospital, and in the Grace Maternity Hospital, under the direction of the staffs of the several hospitals including Drs. Hogan, H. K. McDonald, Murphy, McDougall, Kenneth McKenzie, Mack, Eager, Johnston, Curry, Cunningham, Doull,

Lessel, Muir, Silver, Weatherbe, and P. A. MacDonald. Special lectures were given by Dr. Hattie, P. H. O., Dr. Murdoch Chisholm, and Dr. John Stewart. Demonstrations were given by Profs. John Cameron in Applied Anatomy, and A. G. Nicholls, in Morbid Anatomy. A visit was also paid to the Halifax-Massachusetts Health Centre No. 1.

An added element of interest lay in the fact that 1922 is the fiftieth anniversary of the graduation of the first University class in Medicine, and this event was commemorated by a banquet at the Halifax Hotel, at which eighty-five covers were laid. The sole survivor of this class was present, Dr. Finlay McMillan of Sheet Harbour, N. S., and attended the graduate course. During the course of the proceedings Dr. McMillan was presented with a gold-headed cane by the medical men of the Province. Addresses were given by Dr. A. Stanley McKenzie, President of Dalhousie University, George S. Campbell, Esq., LL.D., Chairman of the Board of Governors, Dr. John Stewart, Dean of the Faculty, and a number of others.

So much appreciation of the course was expressed by the visiting doctors that it is practically certain that a repetition will be undertaken next year, and, perhaps a little more elaborately.

Halifax is an outpost of civilization on this continent, but, perhaps, because of its very remoteness from other scientific centres, is proving to be a rallying-point for the intellectual life of the Provinces down by the sea. The Medical School of Dalhousie University is fortunate in that it possesses an ideal "lay-out" for its special purposes. The various hospitals, general and special, form a coordinated system, placed close together, and grouped about the medical faculty building, in a manner that is rarely seen even in the larger cities. A new laboratory building in which physiology, pharmacology, and biochemistry will be housed is rapidly approaching completion, and an out-patient dispensary and Health Centre has been begun. An extensive addition to the pathological building is projected, and, it is hoped, will soon be undertaken. The Faculty is only waiting for the increased accommodation, in order to make some much-needed additions to its teaching staff. The outlook in Halifax is undoubtedly gratifying and inspiring.

A. G. N.

DALHOUSIE UNIVERSITY—CEREMONIES AT THE LAYING OF THE CORNER STONE OF THE NEW MEDICAL SCIENCE LABORATORY BUILDING

"Dedicated to the glory of God and for the good of man." In the words of Dr. John Stewart, Dean of the Faculty of Medicine, who performed the ceremony, the corner stone of the Medical Science Laboratory Building of Dalhousie University was laid. Simple and impressive exercises marked the occasion. The corner stone is to the right of the main College Street entrance, and bears the following inscription:

This stone was laid by
John Stewart, M.B., C.M., LL.D.,
C.B.E.
Dean of Faculty of Medicine,
1922.

President Mackenzie, in a brief address, took occasion to emphasize the necessity of college confederation from the viewpoint of economy in the rapid development now demanded of Universities. He traced the history of the development of Dalhousie from the old building on the Grand Parade, which had served the demands of Dalhousie for sixty years. Then the building now known as the Forrest Hall was built, and that served the demands of the University for only a generation. In the first half of this generation eight buildings had either been erected or purchased for the needs of the University, and it was not improbable that in the next half of this generation another twelve such buildings will be added to Dalhousie University alone.

President Mackenzie considered that College confederation was most desirable in order to secure the conservation of all resources, and meet the increasing demands of teaching and research in the present day. The President paid tribute to Dr. Stewart, not only as the Dean of the Faculty, but as one, who, though it was the work of younger men, had heard the call to duty in the stress of war and had led the medical forces of the Province.

In describing the uses to which the new building will be placed, President Mackenzie said that it would for the present be used for the study of Bio-Chemistry, Physiology, Pharmacology and Hygiene. It was built as a unit and in time, as the needs of the College required, three other units would be built, providing one for each of the subjects now to be housed in the new building. He sketched how, when this was accomplished, there would be four such buildings, one on each side of the Forrest Hall and the ground on which that building now stands would be converted into a court on which all four buildings would front. This accounted for the fact that the south side of the new building was identical to the College Street front.

Dr. Stewart, using the same trowel with which Lord Dalhousie laid the corner stone of the first Dalhousie Building , over a hundred years ago on the Grand Parade, performed the simple ceremony of dedicating the building. In his brief remarks following the ceremony, Dr. Stewart referred to the spirit of continuity which bound the University; the same spirit inspired the College today as when Lord Dalhousie laid the stone of the first building. The foundation sciences of medicine were to be taught in the building, and "we can well and truly say that it is dedicated to the glory of God and the good of man."

Dalhousie University began the present session on October 5th with an enrolment of 202 students in the Faculty of Medicine. The six years' course is now fully inaugurated. The enrolment in all Faculties is about 750 students.

The post-graduate course offered by the staff of Dalhousie University to the profession in the Maritime Provinces has proved very successful and very well attended.

QUEBEC

McGill University will have this year a Psychological Clinic in charge of Prof. W. D. Tait. His equipment is of the most modern type.

A memorial window has been placed in the Medical Building of McGill University by the teaching staff of the Medical Faculty in memory of the late Lieut.-Colonel John McCrae, Lieut.-Colonel H. B. Yates and Lieut.-Colonel R. D. Campbell. The window designed by Prof. Nobbs, late Professor of Architecture, is placed in the hall on the first floor directly over the main entrance to the building, and is in three divisions. The central portion dedicated to Lieut.-Colonel John McCrae

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displays in the centre, rows of crosses standing on a field of poppies; a jewelled plaque displays a book and a quill. The section on the right dedicated to Lieut.-Colonel Yates shows the town of Boulogne; its plaque bears a microscope. The section on the left to the memory of Lieut.-Colonel Campbell shows a view of the Thiepval front where he was killed in action. The plaque displays a surgeon's knife, bandages and scissors. Above, in the centre light, a radiant sun is shown on the horizon with rays spreading upward and to each side. On the far left strings of maple leaves entwine a group of poplars, on the right are sprigs of laurel similarly grouped.

At the meeting of the Montreal Medico-Chirurgical Society on October 6th, Dr. Reginald Morten, of London England, gave an address on deep x-ray therapy as first introduced in Erlangen. After two years' experience with it, he considered that it yielded good results especially in carcinoma of uterus, rectum and oesphagus. In one case of carcinoma of the oesophagus which he had treated 18 months ago after an operation for gastrostomy had been performed, the patient is able to swallow and is still alive.

The following candidates arranged alphabetically were successful at the recent examinations at McGill as reported by the registrar, Dr. R. W. Powell, of the Medical Council of Canada. This registration is under the provisions of the Canadian Medical Act, which grants a qualification of L.M.C.C. accepted for registration and license in every province of Canada.

The successful candidates are: A. Achpise, Paris, France; H. MacAllen, Toronto; J. M. Baxter, St. John, N.B.; F. G. Beall, Westmount, Que.; E. M. Blair, Truro, N.S.; Jessie M. Boyd, Westmount, Que.; E. B. Chandler, Moncton, N.B.; C. G. Clements, Wapella, Sask.; J. G. Copeland, Cornwall, Ont.; R. B. Coulson, Ottawa; C. T. Coulter, Malone, N.Y.; N. DesBrisay, Toronto; C. L. Emerson, St. John West, N.B.; T. H. Field, Edmonton, Alta.; R. Fitzgerald, Calgary, Alta.; C. Fluhmann, Kenogami, Que.; D. C. Gordon, Ottawa; J. H. Grant, Port Elgin, N.B.; R. S. Grimmett, Edmonton, Alta.; H. Hart, Westmount, Que.; H. F. Howe, Palmerston, Ont.; I. C. Humphreys, Kinburn, Ont.; K. O. Hutchison, Montreal; J. E. Imbleau, Renfrew, Ont.; H. M. Jardine, Moncton, N.B.; F. L. Jones, Ottawa, Ont.; A. T. Kibzey, Winnipeg, Man.; J. M. Kinsman, Wolfville, N.S.; W. Laishley, Ottawa; P. A. Lyster, Red Willow, Alta.; J. McGregor, Victoria, B.C.; J. F. McIntosh, Westfield Beach, N.B.; D. W. McMillan, Westmoreland, N.Y.; E. C. McLeod, Plenty, Sask.; J. S. Murray, River John, N.S.; N. K. Neilson, Arnprior, Ont.;P. L. O'Shaughnessy, Cobalt, Ont.; H. A. Pearce, Edmonton, Alta.; H. H. Sharp, Sussex, N.B.; G. F. Strong, Vancouver, B.C.; N. T. Williamson, Westmount, Que.

THE INAUGURATION OF THE NEW BIOLOGICAL BUILDING OF McGILL UNIVERSITY

The new Biological Building of McGill University, which houses the departments of physiology, biochemistry, pharmacology, botany and zoology, the erection of which was rendered possible by the munificence of the Rockefeller Foundation, was formally inaugurated on October 6th, with a programme of ceremonies which included addresses, a reception and a banquet. The opening addresses, immediately preceded by an address of welcome from the Principal, Sir Arthur Currie, were delivered in the afternoon at the Royal Victoria College by Professor Sir Charles Scott Sherrington, G.B.E., President of the Royal Society, and Waynflete Professor of Physiology, Oxford, who came to Montreal for the occasion, and Dr. Harvey Cushing, Mosely Professor of Surgery in Harvard University. Addresses were also delivered in the morning to an audience of students and members of the Faculties by Dr. F. M. Coulter, Professor of Botany of the University of Chicago, on "The Botanical Perspective" and Dr. H. J. Hamburger, Professor of Physiology in the University of Groningen, Holland, on "A New Form of Correlation between Organs." Amongst the invited guests of the University who attended the ceremonies were Dean R. H. Chittenden, the veteran Professor of Biochemistry of Yale University, Professor W. J. Gies, of Columbia University; Professor Bazett, of the Univerity of Pennsylvania; Professor Thomas McCrae, of the Jefferson Medical College, Philadelphia; Dr. John Stewart, of Halifax, representing Dalhousie University; Dr. S. Grondin, of the Medical Faculty of the University of Montreal; Professors A. Primrose and J. J. R. MacLeod, the Dean and Associate Dean of the Medical Faculty of the University of Toronto, and Professor Spencer Melvin, of Queen's University.

After the formal inauguration, a reception was given to all the guests, visitors, members of the staff and friends of the University in the new building, which was then thrown open for inspection to the several hundred who were present. In the evening a banquet attended by the specially invited guests and the members of the staff was held in the Ritz-Carlton Hotel, with Sir Arthur Currie presiding, at which toasts were proposed to Sir Charles Sherrington and the other special guests, and to the Royal Society, to which Sir Charles and Dean F. D. Adams, of the Faculty of Applied Science, replied.

A special Convocation of the University was held on the afternoon of October 7th, at which the Honourary Degree of Doctor of Laws was conferred on Sir Charles Sherrington because of his contributions through research to physiology and of his distinguished standing in the scientific world. Sir Charles in an address expressed his appreciation of the honour conferred on him by a university of such standing as McGill.

The new building puts at the service of the Medical Faculty of McGill University such accommodation and equipment in its scientific departments as to place it, in this respect, amongst the leading medical faculties of the American continent.

ONTARIO

No. 6. District Medical Meeting of the Ontario Medical Association, comprising the Counties of: Peterboro, Victoria, Durham, Northumberland, Hastings, Prince Edward and Haliburton, was held in Trenton, on Friday, September 29th, Dr. E. A. McQuade of Trenton, Counsellor of the District presiding. The following programme was presented in the afternoon: Abscess of the Lung, (Illustrated by Lantern Slides), F. C. Neal, Peterboro; Osteomyelitis, A. S. Tilley, Bowmanville; Intestinal Obstruction, Geo. Stobey, Belleville; Tetanus, C. V. Mulligan, Lindsay; Malignant Disease of the Uterus, (Illustrated by Lantern Slides), G. Stewart Cameron, Peterboro.

After an enjoyable banquet at the Gilbert House,

NEWS ITEMS TO APPEAR IN THE FOLLOWING ISSUE, AND TO BE OF VALUE MUST BE RECEIVED BY THE EDITOR BEFORE THE 15TH OF THE MONTH

addresses were delivered by E. R. Secord, President, and T. C. Routley, Secretary, of the Ontario Medical Association and Mr. Nelson Parliament, Speaker of the Provincial Legislature. The meeting was altogether successful.

No. 2. District Medical Meeting of the Ontario Medical Association, comprising the Counties of: Brant, Oxford, Perth, Waterloo, Wellington, Huron and Norfolk was held at Kitchener, on the afternoon and evening of Wednesday, Sept. 27th, with Dr. Weston Krupp, of Woodstock, Counsellor of the District, in charge. The afternoon session was presided over by Dr. J. P. Giguere, President of the North Waterloo Medical Association, under whose auspices the district met. The following papers were presented: Psycho-analysis in its Relation to Mental Disorders, G. S. Glassco, Hamilton; Perforation of the Stomach and Duodenum, Hadley Williams, Prof. of Surgery, Western University Medical School, London; Applied Physiology of Internal Secretory Organs, J. J. R. MacLeod, Professor of Physiology, University of Toronto; Arterio-Venous Aneurysm, C. F. Hoover, Prof. of Medicine, Western Reserve University, Cleveland, Ohio: In the evening after an excellent banquet, addresses were delivered by Dr. Secord, President, and Dr. Routley, Toronto, Secretary of the O. M. A. An attendance of between eighty and ninety was manifest evidence of the keen interest taken in the meeting by the practitioners of the District.

GENERAL

The College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about Three Hundred Dollars, will be made on July 14, 1923, provided that an essay deemed by the Committee of Award to be worthy of the Prize shall have been offered.

Essays intended for competition may be upon any subject in Medicine, but cannot have been published. They must be typewritten, and if written in a language other than English should be accompanied by an English translation, and must be received by the Secretary of the College on or before May 1, 1923. Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author. It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within three months after the award. JOHN H. GIRVIN, *Secretary*, 19 SOUTH 22D STREET, PHILADELPHIA, PA. U.S.A.

Treatment of Tuberculous Cervical Adenitis.—Richard H. Miller, Boston, states that there is no certain therapeutic agent, no absolute specific, and no set rule for treating tuberculous cervical adenitis. To lay down a definite scheme, and treat every case thereby is, in his opinion, not productive of the best results. Each patient must be carefully studied and considered as an individual, and then, by the judicious application of five chief methods, hygiene, light, radiation, surgery and tuberculin, either singly or in combination (for each has its place), it will be possible, to approach, as nearly as possible, a therapeutic goal. When a diagnosis of tuberculous adenitis is made, hygiene and mode of living are investigated, and corrected as indicated. The tonsils and adenoids are removed, unless contraindicated. Acute abscesses are drained. Discrete cold abscesses without acute superimposed infection are opened through a small incision, and drained for a few days with a small rubber tube. Patients with chronic discharging sinuses are treated with tuberculin plus the mercury vapor quartz lamp. Discrete localized glands are at the outset either removed or treated with tuberculin. Extensive disseminated glands, and those showing deep involvement, are treated with tuberculin. If this fails then roentgen ray is tried, and lastly operation.—*Jour. Am. Med. Assoc.*, 1922.

The Acute Painful Back Among Industrial Employees Alleging Compensable Injury.—Trauma, Harold R. Conn, Akron, Ohio, asserts is blameless as an etiologic factor in a large percentage of cases of alleged traumatic back. Malingering is of uncommon occurrence, but often is implied to the surgeon by the patient's false conceptions of etiology and an overanxiety to establish the recognition of a real disability. Osseous abnormalities in the low back furnish a potential group, especially susceptible to violence but capable of developing disability unexcited by trauma. Sacro-iliac relaxations are of infrequent occurrence. Sacrolumbar lesions are properly of two classes as regards the involvement of the articulation, extrinsic and intrinsic, the latter representing the grave traumatic lesions of most common occurrence.—*Jour. Am. Med. Assoc.*, Oct. 7, 1922.

Obituary

JOHN JOSEPH MACKENZIE

An Appreciation by Horst Oertel.

CITA mors ruit! The death of John Joseph MacKenzie has removed--alas, altogether too soon—the senior pathologist of Canada; a founder and pioneer of scientific pathology in the Dominion. For MacKenzie was amongst the first on this side of the Atlantic to recognize and teach pathology as an independent biological science, and not simply as an appendix to the practice of medicine. He brought to it the mature judgment and solid foundations of a thorough scientific training and inspiration, which he had acquired in Toronto under Ramsey Wright, in Ludwig's laboratory in Leipzig, and in Berlin, where the influence of Virchow, Du Bois Reymond and Koch were strongest. These influences and his early and lasting associations with such men as Macallum, MacPhedran, and Clarke helped to shape and maintain his mind in classic frame. True to them and himself he lived and died. For almost a generation he taught, enthused and largely shaped the minds of the students in Toronto. He gave them that broad comprehensive foundation and inspiration without which the practice of medicine ceases to be a scientific profession, and becomes a sterile trade. A clear, straight thinker, a sympathetic teacher and adviser, a true friend, he stood aside from spectacular displays and hectic investigations, an exponent of the soundest critical judgment.

It has been said of Virchow that his greatest accomplishment was to have taught the physicians of his generation to think objectively. Thus also, in the educational battle against ignorance and unreason in medicine, against hasty uncritical generalizations and conclusions, MacKenzie took a leading, perhaps the leading part on this side of the Atlantic. It is impossible to overestimate the value of his sober, even tempered teaching. He was a conservative in the best sense of the term. Not blind to progress and to new ideas, he exercised a masterly restraint in his own work and in accepting that of others.

The aesthetic part of his nature was strongly developed. Of artistic temperament and inclinations, he enjoyed fine things outside of his calling. His personality combined in an interesting and appealing manner characteristics which Canadian soil and life shape out of fine old Scotch descent. His mind was flexible with a strong bend towards the humorous side even in trying situations. When we sat together and he unbent, he showed noble emotions. Sympathy with and tolerance of human weaknesses appeared in him with independence and strength of his own views which are rarely found combined in one man. Last, not least, MacKenzie recognized quality and had the courage to proclaim it!

Thus he stands and will always stand before me. To have him removed from us when sober leadership is most needed in academic life is nothing short of a calamity.

Vita nostra brevis est,
Brevi finietur,
Venit mors velociter
Rapit nos atrociter,
Nemini parcetur.

But it is a comfort to know that death may not extinguish his personality. A noble character like his does not end its life with death, but continues in the minds and actions of those who remain, a potent influence on posterity!

Harris Graham, A.B., Toronto University, M.D., Michigan University, thirty-three years professor of pathology and practice of medicine in the American University of Beirut died at his post in Beirut, Syria, Feb. 27th, 1922, in his 60th year. He was born in Ottawa, Canada, and was of Scottish descent. He obtained his baccalaureate at Toronto when twenty years of age, and, on receiving his degree at Ann Arbor, he was the same year commissioned by the American Board of Foreign Missions as a missionary to Turkey, where he arrived in 1885. He married Miss Ella Bray, a fellow missionary, at Constantinople. All Dr. Graham's outfit,—instruments, books and equipment—was lost at sea.

Dr. and Mrs. Graham were sent to Aintab. On the overland journey a kick of his horse broke his leg; but he reduced the fracture himself and continued his journey of several days on horse back. Arriving at Aintab he at once began the study of Turkish, and the teaching of pathology and physiology in the medical school connected with the Central Turkey College, an institution supported by the American Board. After four years of this work, with touring and practising in the summers to raise money to carry on the work, the Turks closed the school. The Turk can endure to see nothing flourish! Dr. Graham was called to the vacant chair of pathology in the American University of Beirut, then called the Syrian Protestant College. Here he served brilliantly for a generation and was called away in the midst of his greatest powers. In 1892, Dr. Graham who for several years taught bacteriology in addition to practice of medicine and had leave to go to Berlin and study in Koch's laboratory; on many other vacations he pursued post-graduate studies in pathology in Berlin and Vienna. Dr. Graham was the first to demonstrate that the culex carries the germ of dengué fever, and first isolated that microbe. Patients came to him from all over the Near East. He was a remarkable linguist, having command of a rich and lucid vocabulary in English and in addition was fluent in Arabic, Turkish, French and German, spoke Italian fairly well and could interrogate a patient in modern Greek and Armenian. He had a sympathetic manner that won the hearts and confidence of his patients. As a teacher he possessed force, inspiration and thoroughness. He used bed-side and case history teaching

long before it was common in American schools. There are two other Canadians on the Medical Faculty of Beirut; Dr. C. A. Webster, professor of Anatomy and Opthalmology, a graduate of Toronto, and Dr. Douglas Cruikshank. M. B. ADAMS

Dr. C. S. Moore, of London, Ont. died on Sept. 26th. In him the medical profession lost a great soul and a true physician. Dr. Moore was born in London, on Aug. 26, 1852, and received his education in the old Union School and Hellmuth College for boys. He graduated from McGill University and began active practice when twenty-one years of age. Even before that time, he had been initiated into practice by assisting his father, Dr Charles D. Moore, whose skill as a surgeon helped to shape his son's inclinations. Occasionally, in a reminiscent mood, would some of the incidents of those pre-anaesthetic days be revealed to a fortunate listener. He had an early connection with the Western University and for some years was Professor of Gynaecology, later going to the Senate and more recently acting on the Executive Board of the Institute of Public Health.

His was a magnetic character and a companionable soul. His philosophy of life was inspiring and his humour, and appreciation of the same, unusually keen. He found time to read and was a lover of good literature and an interesting conversationalist. His delight was to be known as a general practitioner and his reward was in the rôle of the family physician. With him has passed away one of those all too few examples of this grand old type, whose memory is an inspiration and an ideal.

He had two hobbies. One was medicine and the other was the youth of his clientele. To the latter he was a tower of strength and a friend indeed, whenever encouragement or a word of friendly advice was in season. He was uniformly kindly, courteous, generous and always ready to help a confrère and none could be wider in sympathy or more cordial in support. He was a firm believer in the value to a young woman of a nurse's training as a medium for character making.

Book Reviews

Endocrine Therapeutics. By Thomas Bodley Scott, cr. 8vo., 118 pages, price 5s. H. K .Lewis & Co. London, 1922.

This excellently printed and bound little book is a credit to its publisher. It is well written and in places deserves its subtitle of "Practical Suggestions" as the author has endeavoured to show how he employs what he understands of the complicated theories of Endocrine Therapeutics. Like the other books of its class it is too enthusiastic and not sufficiently critical. His practical suggestions are not, in many cases, really founded on ascertained fact but on the speculations of such authors as Sajous; nor are case histories and treatment given clearly and distinctly so that they form a real guide to the practitioner. Suggestive this book certainly is, but the reviewer doubts greatly its "practical" value. V. E. H.

Chloroform Anaesthesia. By A. Goodman Levy, M.D., M.R.C.P., p.159, with foreword by Prof. A. Cushny. Price 7/6. John Bale, Sons and Danielsson, London, 1922.

This is an excellent book, well printed and a great credit to all concerned. Levy is a practical anaesthetist who, by years of experimental as well as clinical work, has done much to improve the administration of chloroform as an anaesthetic. His work has, at last, served to explain the chief danger in the administration of chloroform, namely, early cardiac syncope. He has shown that this extremely dangerous condition arises only in light anaesthesia, usually during induction but is possible during recovery from a deeper anaesthesia, and is due to a sudden fibrillation of the ventricles of the heart. This is due partly to (a) the effect of small amounts of chloroform increasing the irritability of the ventricle and (b) also to some other stimulation, such as the administration of adrenalin, reflex effects as in struggling, from surgical interference, or from handling or even from the respiratory passages. He has pointed out how this danger frequently can be avoided and even cured should it occur. Everyone who has occasion to administer chloroform should read this book carefully. He should not be dismayed by the scientific chapters but should carefully follow them as in them many popular theories are disproved. General practitioners will also profit by this book and should note that Levy estimates the dangers of death at about one in thirteen hundred and also that he strongly points out the dangers of anaesthesia by chloroform and ether in mixtures or in succession, estimating their death rate as much higher than from chloroform alone. V. E. H.

Endocrine Glands and the Sympathetic System. By P. Lereboullet and others. Translated by F. Raoul Mason, M.D., with the collaboration of Daniel R. Ayres, A. B., M.D. 378 pages, price $6.00. Published by Lippincott Company, 201 Unity Building, Montreal.

The French physician has a special aptitude for clinical description and a fine ability in the analysis of symptoms and the differentiation of clinical complexes. The French authors of this book are splendid examples of their school, and the original work must have been a delight to read and a genuine contribution to our knowledge of the subject. An undue amount of credit however, is given to French workers probably due to unfamiliarity with the work done in foreign schools. The splendid work of Kendall in isolating the active principle of the thyroid, as well as the clinical work which has followed from this discovery is not mentioned.

It is a pity that the translation is so bad. It seems to have been done by some one who is unfamiliar with good English and also of the subject. Actual mistakes or clumsy English occur on almost every page. The use of a singular subject and a plural verb is not uncommon: p. 109, "Toxic tetany are very rare." New words are also invented: p. 136, "*Cómatous* phenomena" :p. 135, "are really pure cases of adrenal insufficiency slowly *evoluting*." "Evoluting" is a favorite word of the translator. Who has heard of "Glycosuria tremors?" p. 151, the sentence, p. 134, "The urines are decreased in quantities" has a peculiar ring to English ears as has the phrase p. 93, "theoretical facts." The ignorance of the translator makes the meaning of many passages doubtful and in some cases unintelligible without both knowledge and thought. The proof reading has been done none too well, and the American habit of printing gastro-intestinal or non-toxic as two words without hyphens is distinctly unpleasing to English eyes. It is unfortunate that the book as printed should have been published by a good firm.

While the book can be recommended to the Canadian reader for its clinical descriptions, he will find the terminology often unfamiliar and, in the chapter on the sympathetic system, where a purely personal nomenclature is used by the author, so confusing as to make it valueless. V. E. HENDERSON

Books Received

Bibliography on Radium. Its uses and results from its discovery up to January, 1922. Compiled by American Institute of Medicine for United States Radium Corporation, New York.

Radium. Abstracts of selected articles on Radium and Radium Therapy. Compiled by American Institute of Medicine for United States Radium Corporation, New York.

Opthalmoscopy, Retinoscopy and Refraction. By W. A. Fisher, M.D., F.A.C.S., with 248 illustrations, including 48 colored plates. Price $4.00. Published by W. A. Fisher, 31 North State Street, Chicago, Ill.

Endocrine Glands and the Sympathetic System. By P. Lereboullet and others. Translated by F. Raoul Mason, M. D., with the collaboration of Daniel R. Ayres, A.M., M.D. Price $6.00. Published by J. B. Lippincott Company, 201 Unity Building, Montreal, 1922.

Medicine. Analytical Reviews of General Medicine, 6th edition thoroughly revised. 12 mo of 525 pages, with 245 illustrations. Price $3.00. Published by W. B. Saunders Co., Philadelphia and London; J. F. Hartz Company, Toronto.

Medicine. Analytical Reviews of General Medicine. Neurology and Paediatrics. Volume 1, No. 1, edited by David L. Edsall, Harvard Medical School, and John Howland, Johns Hopkins Medical School. Published quarterly by Williams & Wilkins Company, Baltimore, U. S. A.

The Practical Medicine Series. Comprising eight volumes on the year's progress in medicine and surgery, under the editorial charge of Charles L. Mix, A.M., M.D. Each volume is complete on the subject of which it treats for the year prior to the time of publication. Volume 1 on General Medicine, price $3.50. Price of eight volumes, $18.00. Published by The Year Book Publishers, 304 Dearborn Street, Chicago, 1922.

PRINTER WAS PEEVED

Charley Harris, in the printing business, got slightly peeved at a letterhead from a doctor who wanted bids on several thousand letterheads, different sizes, different grades and different colours, and wanted the printing form held standing. So, Charley took his typewriter in hand and wrote: "Am in the market for bids on one operation for appendicitis. One, two or five inch incision —with or without ether, also with or without nurse. If appendix is found to be sound, want quotations to include putting same back and cancelling order. If removed, successful bidder is expected to hold incision open for about sixty days, as I expect to be in the market for an operation for gall-stones at that time and want to save the extra cost of cutting."—*Kansas City Post.*

Extraordinary Development of the Tactile and Olfactory Senses—Thomas J. Williams, Chicago, discusses the case of Willetta Huggins, aged 17, who "smells" colors and "hears" with her finger tips. She has been wholly deaf seven years and completely blind for about two years.—*Jour. Am. Med. Ass.*, Oct. 4, 1922.

Milk-Borne Diphtheria—An epidemic of diphtheria in Austin, Texas, was investigated by Malcolm Graham and E. H. Golaz, Austin, Texas. Fifty-two cases of a total of seventy-one were traced to infected milk. More than 80 per cent. of the cases were in adults. The membrane was atypical, and the infection was unusually virulent. The source of the infection was traced to a milker who had a perforating ulcer of the septum, which was covered with a white, membranous deposit. Cultures gave a luxuriant growth of typical diphtheria bacilli, and the organism was powerful enough to kill a 350 gm. guinea-pig in thirty-six hours. Another pig, injected but protected by antitoxin, had no ill effects. The perforation existed four years; it had been diagnosed syphilitic, and several treatments had been administered. The man had had difficulty at times for a year breathing through his nose, and would relieve himself by blowing violently to force from the nostrils a mass of whitish material. The authors urge that nose cultures should always be taken as well as throat cultures.—*Jour. Am. Med Ass.*, Oct. 4, 1922.

Resuscitation by the Intracardiac Injection of Epinephrin—Julius Gottesman, New York, reports the case of a man, aged 73, with generalized arteriosclerosis, who developed severe pain in the right leg due to trophic changes. The pain continued to be very severe, and, September 20, amputation of the affected extremity under spinal anaesthesia was attempted. The injection of 10 c.c. of 1 per. cent. solution of procain into the spinal canal was followed almost immediately by drowsiness, cyanosis and shallow respiration. The heart action remained good for about five minutes, when the patient became unconscious, respiration ceased, and the pulse and the heart sounds could not be detected. Artificial respiration was begun and various cardiac stimulants, including caffein, camphor and epinephrin, were given hypodermically, but without effect; the breathing had ceased and the heart action seemed to have ceased. Twenty minims (1.2 c.c.) of epinephrin, full strength, was then injected into the left auricle by puncture of the chest wall between the left third and fourth ribs, the position in the cavity of the heart having been determined by aspiration of blood. There was immediate reappearance of the radial pulse and of feeble respiratory efforts. This was followed by the return of the heart sounds. The cyanosis was gradually replaced by normal color, and within a few minutes respiration became regular, the heart action good, and consciousness was restored. After this the patient made an uneventful recovery from his symptoms.—*Jour. Am. Med. Ass.*, Oct. 14, 1922.